LIBRARY,
JAN 24 1901
UNIVERSITY OF TORONTO

JOHNS HOPKINS UNIVERSITY CIRCULARS

Published with the approbation of the Board of Trustees

Vol. XX.—No. 149.] BALTIMORE, JANUARY, 1901. [Price, 10 Cents.

NOTES AND REVIEWS.

HISTORY AND POLITICS.

The Revenue System of China. By Alfred E. Hippisley, Commissioner of Imperial Maritime Customs, China.

[Abstract of an address before the Seminary of History and Politics, Johns Hopkins University, November 16th, 1900.]

EDITORIAL NOTE.

Mr. Hippisley, the author of the following paper, is an English gentleman who has been a resident of China for many years, and has held the most prominent offices in the Imperial Customs under Sir Robert Hart. On the invitation of the President of the Johns Hopkins University he kindly consented to address the graduate students in Economics and Finance at one of their evening meetings, and subsequently at their request he prepared the following abstract of his remarks.

The Chinese government publishes, indeed frames, no national budget. Each autumn, however, the Board of Revenue in Peking, as head of the financial administration of the Empire, draws up a statement of the requirements of the metropolitan bureaux for the following year and of the contributions to be made towards them by the several provinces. The expenses of provincial administrations are defrayed from land-tax and a portion of the *likin* collection, while from what remains of these and the other headings of revenue enumerated below those of the Imperial Household, the metropolitan administration, the defence of the northern provinces by land and sea, of the Foochow arsenal, extraordinary works in connexion with the embankments of "China's Sorrow," the Yellow river, etc., etc., are defrayed. From steady reading of the *Peking Gazette*, which is a collection of such official documents as the Privy Council sees fit to make public and which from time to time contains reports (more or less fragmentary) from Viceroys and Governors on all these subjects, an approximate estimate may be formed of China's revenue, which may be stated thus:

Land tax, levy in kind commuted to money payment, nominal amount Taels 25,000,000, actually,	Taels	20,000,000 =	$14,160,000
Land tax in kind (to Peking),	"	6,000,000 =	4,250,000
Likin on merchandise, net,	"	15,500,000 =	10,930,000
Salt duty and *likin*,	"	12,000,000 =	8,500,000
Native customs,	Taels	3,000,000 =	2,125,000
Foreign customs, *i. e.*, customs under Foreign Inspectorate,	Taels	23,500,000 =	16,695,000
Miscellaneous,	"	5,000,000 =	3,540,000
Total,	Taels	85,000,000	$60,200,000

The population of China being estimated at about 400,000,000, these figures seem to show that taxation is there very light, amounting to only some 16 cents per caput per annum. In China, however, reality differs much from appearance, and in revenue matters no less than in other departments; the result being that the collection reported affords no adequate index of the sums actually paid. To understand the *raison d'être* of such a system, it is necessary to bear in mind that while each official has himself to pay his own staff which—as the territorial officials all exercise administrative, executive, and judicial functions—comprises a large number of individuals, as well as to meet the expenses of himself and family, his official salary is altogether inadequate to meet such calls. It is therefore necessary that he supplement his salary from other sources, and so long as he turns into the treasury in a given year as much as, or better still a little more than, was reported the previous year, no questions are asked; unless the exactions are so increased as to rouse popular discontent. But this system, or want of system, works great hardship to those who have to pay.

A few words as to each item of revenue.

Land-tax. The Emperor is the over-lord of all landed proprietors, who had to pay a rent in kind. This was commuted in 1853 into a money payment on the basis, as rice was the staple rent paid, of Taels 1.30 for 160 lbs of rice, which works out to a payment according to the rating of the land of from $0.40 to $1.70 per acre. It is necessary to remark that there is no such coin as a *tael*; it is simply an ounce weight of silver, which varies in fineness in almost every province and therefore in value expressed in gold or other commodities. The only coin in use is the *cash*, circular in shape with a square hole in the centre—except in the neighborhood of the treaty ports where dollars (chiefly Mexican) and fractions of dollars (chiefly Hong Kong) are current, supplemented of late years by the issues of the various Chinese provincial mints. This *cash* is really the unit of currency and is the basis of all governmental taxation. The exchange between *cash* and silver was definitely fixed at the time of commutation, but the collectors have persistently increased the rate to the detriment of the farmers whose burdens have been further seriously aggravated by the steady appreciation of copper during the last few years. This appreciation has caused the metallic value of the *cash* to exceed its value as coin, with the result that, despite a legal death penalty for mutilating coin, more and more *cash* find their way each year to the melting-pot, and the consequent scarcity of the coin appreciates its value still higher.

The nominal total of the Land-tax is about Taels 25,000,000. But as a bumper year is only supposed to yield 90 per cent. and as allowance must be made for reductions on account of drought or inundation, the actual receipts do not exceed the sum I have named, Tls. 20,000,000. In addition, a certain quantity has always been sent to Peking for the use of the troops there. The Japanese war having shown that supplies for Peking from the South might be cut off by a hostile fleet, orders were issued abolishing the commutation system and ordering that the tax be forwarded in kind, and by the Grand Canal. It proved, however, impossible to give effect to these orders, as the transport expenses would actually exceed the money value of the rice—a notable instance of the primitive state of inter-communication in China, and of the ruinous extravagance of governmental methods. An instance of how wedded to routine and how lacking in initiative Chinese methods are has been recently afforded by an Imperial Commissioner sent to investigate the administration of the Yangtsz' provinces. He found that though all the land rendered unoccupied and waste by the Taiping rebels has in the course of the forty years which have passed since that rebellion was suppressed, been again brought under cultivation, one-fifth of the land in the Kiangsu province was still annually reported as waste land.

Certain of the provinces—Hsinchiang or the New Territory (in Central Asia), Kansu, Yünnan, and Kweichow—are too sparsely populated to raise sufficient *Land-tax* to defray the cost of their administrations, and consequently grants-in-aid have to be sent to them from the richer Eastern provinces.

Likin (Tls. 15,500,000) was instituted in the Yangtsz' provinces during the Taiping rebellion to raise money to pay the troops when other sources of revenue had stopped. It was to have been only a temporary tax, but remains to the present day, and has become the most grievous burden on the trade and property of the Empire. Its name implies that it should represent but one *per mil ad valorem.* But if it was at any time so moderate in amount, it has long ceased to be so; and the tariff shows that in some cases it amounts to 18 per cent. and the liability to *likin* is not exhausted in any one province until 2½ levies have been paid, and the liability begins anew so soon as the goods have passed over the border into a second province. Under such a system the inducements to smuggling are enormous; and to check smuggling preventive stations must be established at such frequent intervals that they are counted by thousands, and the employes by hundreds of thousands. Nor is the amount of the tax its only burden. For a consideration large rebates in the weights of goods passed are made, entailing large bribes at stations subsequently passed to avoid a charge of smuggling—the government loses, and the trader gains nothing. Again boats have to haul-to at each station passed; inspectors can make examination as long or as short as they please; to make them short fees are requisite. Thus traders have, the tax apart, to constantly pay fees; and of the tax collected Mr. G. Jamieson, lately H. B. M. Consul General at Shanghai, estimated in a report to his government, that not more than 30 to 50 *per cent.* is paid into the treasury. In some provinces the high officials have endeavored to remedy this state of affairs by permitting the guild of merchants dealing in one category of goods to pay a lump sum as quittance for the year of all *likin* on that category. This arrangement, it is argued, benefits both government and traders; but in fact it leads to, if possible, even greater abuses than the official system.

The treaty of Tientsin of 1858 allowed foreign merchants to send goods from a treaty port to a specified destination in the interior free of inland dues on payment of half tariff duty *i. e.*, 2½ *per cent.* The Chinese government insisted that this privilege only applied to goods carried by foreign merchants,—a claim which practically rendered the treaty clause nugatory, as foreigners leave the inland distribution to Chinese merchants. Eventually they gave way by allowing that foreign origin of the goods secured the privilege; but they then claimed that the exemption gained was only between port and destination, and that arrived there the goods were liable to such taxation as was recognized. This led to the imposition of differential levies which again destroyed the effect of the treaty privilege; but in the last few years, as the result of constant complaint and claims for compensation, the back of this contention has been broken in several provinces. Probably the opposition of the local officials to this transit pass system would never have arisen, had it been stipulated at the outset that the transit half duty should be paid, not to the Central government, but to the local officials.

Salt Gabelle (Tls. 12,000,000). Salt, chiefly manufactured by evaporation from sea water, is a government monopoly, the right to deal in it wholesale being conferred by licenses for which a heavy tax is charged. The systems of license and of sale are very complicated; but the result is that the wholesale merchants are enabled to raise the price to a point that it becomes on this necessary article of daily diet such a burden that armed bands of smugglers have not hesitated to overpower the preventive patrols on land and to offer battle to government forces at sea.

Native Customs (Tls. 3,000,000) only deserve notice because of their insignificant amount, when regard is had to the enormous internal trade of the Empire. It does not, however, follow that this insignificance means a corresponding freedom from taxation to the trader. For the collectorates are farmed, *i. e.*, the incumbent is required to pay a fixed annual sum into the treasury, and, so long as he does this, what he collects beyond that sum he is at liberty to retain—that the latter is at times enormous is shown by the large fortunes amassed by the heads of the native customs at Shanghai, Canton, and some other places. The importance of such ports is now, however, steadily declining owing to the substitution of steamers for junks, and the consequent transfer of the cargo carried from the control of the native to that of the foreign customs.

Maritime (or Foreign) Customs (Tls. 23,500,000 in 1899). In the early fifties it was recognized that the willingness of the Chinese Customs officials to negotiate and accept a lump sum in quittance of the duties leviable on a vessel's cargo worked injustice, because those who accepted this arrangement passed their goods more cheaply than, and consequently had a trading advantage over, the more scrupulous merchant who, because a tariff had been fixed by treaty, considered himself in honor bound to conform to it in paying duties. The British Consul of Shanghai endeavored therefore to introduce a system under which the Consul should collect duties on goods carried or shipped by foreign vessels on behalf of the Chinese government. The attempt failed at the time; but when in 1854 the Taipings sweeping down the Yangtsz' valley, captured Shanghai and put the Chinese officials to flight, this system was introduced to deal with the trade carried on from the foreign settlements defended by foreign troops. The Customs-house was re-opened in the British settlement under the joint control of three delegates, one each from the British, French and American Consulates. The two last returned to their consular duties, leaving the British delegate, Mr. (afterwards Sir) Thomas Wade, in sole charge. Later he also rejoined his Consulate, being succeeded by an assistant Mr. H. N. Lay. In 1859 at the request of the Kwangtung authorities the system was extended to Canton. In 1861, the Chinese government having by the Tientsin treaty obtained the right to invite British subjects to assist them in collecting their revenue, Prince Kung—head of the newly formed Tsungli Yamên or Foreign Office—formally invested the collectorate of foreign Customs at the treaty ports with regular powers from the Central government, placing the management of it in the hands of Mr. Lay; and branch offices were established at the several ports newly opened by treaty to foreign trade. In 1863, owing to reasons it is not necessary to detail here, Mr. Lay resigned; and Mr. (now Sir Robert) Hart, who had resigned the British Consular service in 1859 to join the Customs at Canton, was appointed Inspector General, and has retained the position to the present date, though in 1885 he was offered and accepted the post of British Minister to China, but resigned without having entered on its duties.

The Foreign Customs had primarily the control of all cargo brought or shipped by foreign vessels; but when Chinese shipping companies were started, its control was extended to them. Its duties, quâ customs, are to inspect any merchandise applied for, to determine the category to which it belongs, and to notify the merchant of the amount of duty due, holding the goods until the banker's receipt for that amount is produced; and at the end of the month to report to the government the amount so collected and at their disposal in the banker's hands. The Foreign Customs does not handle the duty; that is paid directly to a banker (Chinese) at each port specially named by the government for the purpose—a wise provision which precludes the possibility of the suspicion as to honesty which attaches to the native collectorates being extended to the foreign. Further, it builds and maintains all the lighthouses and lightvessels along the coast and on the internal waterways opened to foreign trade; it has established colleges at Peking and Canton for instruction in foreign science and languages; and is now engaged in introducing a national postal service throughout the Empire in place of the native agencies, which have hitherto been the only means for the carriage of letters inland. Moreover, as (missionary matters apart) the questions that give rise to international discussions arise with reference to trade, and as in the early days the Chinese authorities had no acquaintance with international law or foreign modes of thought or procedure, it is but natural that they have sought the advice of the foreigner in their service; and the influence thus exercised has been almost uniformly for good, and has aimed at benefitting China's interests and removing causes of friction.

The extension of the service has been facilitated by two causes: first, the recognition by the Chinese government that they received every penny collected; and second, the automatic nature of its growth, *i. e.*, the establishment of a Customs-house is the natural consequence of the opening of a new port, which has gone far to disarm provincial jealousy and to cause the service to be regarded as part of the governmental machinery for dealing with foreigners. Its stability has been greatly aided by its international composition—as nearly as possible in the ratio of each nation's trade—while the control has remained vested in one head. The growth of the service, of the trade it deals with, and of the revenue it collects is clearly shown by the following figures:

Year.	*Ports.*	*Foreign Trade.*	*Home Trade.*	*Duties (gross).*	*Staff.*
1866.	14	Tls. 118,000,000...	Tls. 32,000,000...	Tls. 8¾ millions...	1000 odd
1886.	19	" 165,000,000...	" 50,000,000...	" 15⅛ "	...2613 "
1899.	32	" 460,500,000...	" 131,000,000...	" 26½ "	...5604 "

of whom 4,611 were Chinese, and 993 foreigners, 503 being British.

This revenue is the only security on which foreign banks will lend money to China. Prior, however, to 1895 the public debt of China amounted to only some $9,250,000.[1] In that year hostilities broke out between Japan and China, the exigencies of which compelled the Yangtsz' Viceroys to borrow, with Imperial sanction, some $25,000,000,[2] while the final treaty of peace imposed on China payment of an indemnity of Tls. 230,000,000, or at the exchange agreed upon of £37,615,000 = $188,075,000. Owing to China's impaired credit and flotation expenses she had to borrow a nominal total of £47,820,000[3] = $239,000,000 to pay this indemnity; and to cover interest and sinking fund on all these loans China has to provide annually—

From date to 1915	— 23 to 24½	million Taels	= $16,825,000 to $17,400,000
" 1916 " 1931	— 17½	" "	= 12,345,000
1932	— 12	" "	= 8,500,000
" 1933 " 1942	— 5½	" "	= 3,850,000

It is now stated that China will be required to pay as indemnity for the destruction of life and property during the recent disturbances and for cost of foreign military expeditions a sum not less than 200 or more than 600 millions of dollars. It is quite impossible for her to pay even the lower sum. To pay $188,075,000 it was necessary for China, when her Maritime Customs revenue was practically untouched, to incur an indebtedness of $239,000,000. Now, when that revenue is mortgaged up to the hilt, it would cost her at least $275,000,000 to raise $200,000,000 in the open market; and that is the only source from which she should endeavor to procure funds, for loans granted or guaranteed by one or more foreign governments would inevitably result in constant interference in the administration of the Empire, and therefore in weakening the power and prestige of the government, and thus tend to promote unrest, and eventually disintegration. To provide interest on and sinking fund for such a loan an annual charge of at least $25,000,000 would be required. How could this be obtained? China's revenue has been reduced by her present indebtedness from over 60 to some 43 or 43½ million dollars, and—as the documents in the *Peking Gazette* clearly show—the metropolitan and provincial administrations are one and all in the greatest straits, and reduced to pitiful expedients to avoid bankruptcy. To place a further charge of $25,000,000 on the revenue would result in immediate default, and the foreign Powers, on behalf of their nationals, would foreclose; and China's independence would be a thing of the past.

---

[1] German 5½ per cent. loan of M. 5,000,000 of 1887, expiring in 1902.
Hong Kong and Shanghai Bank 7 per cent. loan of Tls. 10,900,000 in 1894, expiring in 1914.

[2] Arnhold, Karberg & Co. 6 per cent. loan of £1,000,000 of 1895, expiring in 1915.
Jardine, Matheson & Co. 6 per cent. loan of £1,000,000 of 1905, expiring in 1915.
Hong Kong and Shanghai Bank 6 per cent. loan of £3,000,000 of 1895, expiring in 1915.

[3] Russo-French 4 per cent. loan of £15,820,000 of 1895, expiring in 1931.
Anglo-German 5 per cent. loan of £16,000,000 of 1896, expiring in 1932.
Anglo-German 4½ per cent. loan of £16,000,000 of 1897, expiring in 1943.

Is it then possible to institute new or to increase old taxes to provide funds? That to institute new taxes to pay indemnities to foreign powers is the surest method to create and perpetuate anti-foreign feeling, is a self-evident proposition. As regards old taxes, the *Land-tax* is moderate in amount, but it has remained so long at its present rate that an increase, for no matter what reason, would create general discontent and probably forcible opposition—to allow it to be published that such an increase was made on the demand and for the benefit of foreigners would be the height of folly. That the *Salt Gabelle* is a grievous burden on a necessary article of daily food is proved by the universal smuggling of salt that exists. To increase the tax would be most unwise; and to change the method of collection (except very gradually) would be impolitic, if not dangerous, because the system is so complicated that no one can tell what the effect of any change made would be. *Likin* is already the most grievous burden on the trade and prosperity of the empire. Effort should therefore be directed towards its abolition, not its increase. The *Foreign Customs*—it is scarcely probable that the Foreign Powers would consent to an increase in the treaty tariff—*i. e.*, in the taxation of their own goods—merely to supply funds from which indemnities would be paid to themselves. As regards *Native Customs*, it would undoubtedly be a step in the right direction to place them under the control of the Commissioners of Foreign or Maritime Customs at the treaty ports; and some increase in their amount would no doubt result, but it could not be sufficient to bear the burden of so large a loan.

The leakage under the existent system of collection is admittedly so great that it has been suggested that were an international financial board substituted for that system, it would be possible to enormously increase the receipts without adding to the present levies. The objections to such a proposal are, however, serious; for, putting aside the international intrigues and jealousies which would inevitably result in China as they have in Egypt from such a system, either the authority of the board would be ignored or to enforce it in remote districts of the interior such constant interference with the provincial administration would be rendered necessary that the independence of China—which all the foreign Powers declare themselves anxious to maintain—would vanish, and the control of the Empire would virtually pass into foreign hands. The only course would then seem to be for the Powers to recognize that their treatment of China during late years is, as it undoubtedly has been, one of the chief contributing causes of the present outbreak, and to therefore forego pecuniary indemnity for lives and the expenses of the relief corps, confining such indemnity to property destroyed alone; and to content themselves with insisting on the adequate punishment of the high officials who actively or passively have been responsible for the atrocities committed, as the most likely means of preventing the recurrence of such outrages in the future. Any other course will, I firmly believe, result in calamities beyond all compare greater than any which have yet happened.

The Social Economy Exhibit at the Paris Exposition. By WILLIAM F. WILLOUGHBY.

[Abstract of a paper read before the Seminary of History and Politics, December 7, 1900.]

EDITORIAL NOTE.

Mr. Willoughby was special agent of the U. S. Commission to collect the material for the American exhibit in social economy; he was also a member of the class and group juries in social economy and of the supreme jury for the exposition; he has been requested to write the official report to the President on social economy.

The modern industrial exposition has two clearly defined functions: to furnish a spectacle on a grand scale for the entertainment of the people, and to present a summing up of the progress achieved in all fields of effort. In several departments, of which education and social economy are the best examples, the latter function so greatly preponderated, that the first may almost be disregarded.

To the group of social economy, hygiene and public charity fell the task of showing the positive efforts put forth in each country for the betterment of conditions as distinct from the betterment of appliances and commodities. While the student of practical economic conditions could discover many aspects in which the exhibit made in this group fell short of what might be desired, there can be no question that a mass of information concerning conditions in different countries was presented that was of the greatest value.

To M. Frederic Le Play, the economist to whom economics is indebted for more than one fertile suggestion, belongs the credit of first seeing the desirability of having shown at international expositions material of this character. As commissioner-general of the expositions of 1855 and 1867 he gave a place to this material and at the latter exposition created the famous "new order of awards" for institutions doing the most for the betterment of conditions. At the exposition of 1878 exhibits in social economy were not grouped in a separate classification but distributed among the different sections as an aid to the interpretation of the material shown. At the exposition of 1889, however, great prominence was given to social economy. For the first time a separate room was set aside for the display of exhibits in this section, and the claim of social economy as entitled to equal and coördinate rank in the scheme of exhibits made good. The success of this exhibit was such that the year 1899 marks a distinct epoch in the progress of social reforms in France. Encouraged by this success unusual efforts were made in the organization of the exposition of 1900 to have social economy fully shown. Instead of a special room an entire building was devoted to this group and the various international congresses which held their reunions there during the exposition year.

Time not permitting of anything like an adequate discussion of the material shown, the remainder of the paper was devoted to a consideration of the methods pursued by the United States, as well as other countries, in assembling the material, its display and interpretation by means of charts, models, maps, photographs, documents, etc., and the permanent results of value in the way of special reports and documents concerning economic conditions in the different countries. The most important of these documents were shown to the members of the seminary. Among them may be mentioned the series of economic monographs prepared by the Department of Education and Social Economy of the United States Commission to the Exposition and edited by Prof. H. B.

Adams, the similar series prepared by Austria and Holland, the special volumes covering the whole field of social economy prepared by Germany and Switzerland, and the many special pamphlets prepared by particular establishments descriptive of their social work or important institutions. The most valuable body of literature, however, is yet to appear in the reports of the various juries appointed to examine and report upon this material, and the reports of the international congresses in relation to social questions holding their meetings during the progress of the exposition in the social economy building.

Social Justice: A Critical Essay. By W. W. Willoughby, Associate Professor of Political Science in Johns Hopkins University; author of "An Examination of the Nature of the State." Macmillan, xiv, 385 pp. 1900.

[The following digest was presented by the author to the Historical and Political Science Association, November 2, 1900.]

This work lies within a sphere of inquiry to which ethics may perhaps lay the best claim, but to which economics and politics have nevertheless a valid right. While the facts dealt with by the several social sciences are largely the same, they are examined from different points of view. The special task which falls to the ethicist is the determination of the absolute value of social institutions, and the statement, in as definite a form as possible, of the principles which should govern men in their efforts to adjust their lives to the highest ideals of right and justice. In a certain sense, each social science has thus its own ethic. Each of these separate ethics must, however, rest upon general principles of right, which have first to be determined in the abstract. It is the aim of this volume to ascertain, if possible, these general principles.

Important as is, at any time, the study of these underlying ethical principles, especially urgent is the need for their examination in these present days of social and political unrest. Together with the broadening of the political franchise, there has been secured within recent years an equal or greater extension among the people of intellectual enlightenment and freedom. Ultimate political power has thus been diffused at the same time that tradition and dogmatic religion have lost their former controlling force. Individual reason has been recognized as the true judge of right and wrong, with the result that the peoples of all civilized countries are subjecting social and economic conditions to the same tests of reasonableness and justice as those by which, in the past, they have questioned the rightfulness of political institutions. This criticism has revealed discrepancies in many places between the ethical ideals currently held, and the social and economic conditions actually existing.

The demand of the discontented of the present age is not for a return of the conditions of any former time. The feeling rather is that, taking conditions as they are, the distribution of rewards, economic or other, which actually obtains, should be modified so as to accord more nearly with current conceptions of fairness and right. As long as this feeling prevails, the stability of our social and economic order cannot be guaranteed. Reforms that ameliorate the conditions of the more unfortunate classes may prevent acute trouble, but, until the people generally are able to see at least a substantial realization of the principles which they believe to be just, there cannot be obtained that harmony between popular thought and objective institutions upon which a permanent social order must rest. It is to be emphasized, moreover, that this harmony can only be obtained by satisfying current conceptions of right, in so far as they are essentially valid. It well behooves the social reformer, therefore, to consider carefully which of the popularly alleged canons of distributive justice have in them the elements of truth and rationality. In so far as they are found valid, the way will be pointed out for reforms that will be permanently effective. In so far as they are found invalid, not only will warning be given to those who might be tempted to ill-advised innovations, but the directions indicated along which the economic and ethical education of the people must proceed.

The general character of the inquiry undertaken has been suggested in the preceding paragraphs. Its form and scope may be more particularly indicated as follows:

The first two chapters are devoted to an analysis of the idea of justice as an abstract conception. In the subsequent chapters the principles thus determined are applied to the concrete problems of our social life. There is, or should be, an ethical justification for every social fact, but to attempt specific justifications is obviously impossible. It is possible, however, to examine those features of our industrial and political life which are distinguished, either by their paramount importance or by the ethical controversies that have been waged around them. In so doing there is rendered explicit the principles in accordance with which all other and less important social facts are to be judged.

In mapping out this work, the problems of social justice are grouped under two general heads—the proper distribution of economic goods, and the harmonizing of the principles of liberty and law, of freedom and coercion.

Examining first the subject of distributive justice, the extent to which the principle of equality should play a part is considered. Next is undertaken the definition of the concept, "Property," which involves a critical examination of the various theories that have been brought forward to justify its existence. This done, the way is prepared for a consideration of the general canons of desert that should govern distribution of rewards. The chief theory considered under this head is that which bases the right to private ownership wholly upon labor performed. As a subdivision of this inquiry, but, because of its importance, demanding treatment in a special chapter, is the right to private property in land. The other and less important canons of distributive justice are treated in still another chapter.

The second of the chief problems spoken of above, viz., the harmonizing of freedom and coercion, is treated under the three heads, "The Right of Coercion," "The Ethics of the Competitive Process," and "Punitive Justice."

"Social Justice" is, in a sense, complementary to the author's earlier essay on "The Nature of the State." While that work was, in the main, concerned with an analysis of such political concepts as the State, law, government, sovereignty, etc., this new volume is, as has been seen, devoted to a consideration of those abstract principles of right which should govern the State and society in the control which they exercise over the individual.

No pretense is made that a new system of ethics has been developed. In the main the standpoint taken is that of T. H. Green and the later writers of his school. The only merit claimed, therefore, for the present work, is that in it there has been made a more comprehensive application than has perhaps been before attempted of transcendental principles to the concrete problems of social life.

It is intended, however, that this work shall possess a value not only as a study in ethical speculation, but as a contribution to the history of social and political philosophy, inasmuch as, in the case of each point considered, the treatment has taken the form of an examination and criticism of the chief theories which have been formulated in the past.

Thomas Jefferson: His Life and Writings. Including all his important utterances on public questions, compiled from State papers and from his private correspondence. By S. E. FORMAN. 476 pages. Indianapolis. The Bowen-Merrill Company, Publishers. 1900.

[From a digest of the book prepared by the author.]

From the day on which he wrote the Declaration of Independence till the day of his death, fifty years later, Thomas Jefferson exerted a powerful influence upon the course of American politics. After his death his spirit lived on, and to-day multitudes of men regard him as the greatest prophet of government and expounder of human rights that the world has produced.

What was the exact nature of Jefferson's teachings? What were the precise words of his doctrine? Heretofore it has been difficult for the general reader to get a satisfactory answer to these questions, for the doctrines of Jefferson are scattered through many costly volumes obtainable only in large libraries. It is the purpose of this volume to put the teachings of Jefferson within the reach of all. All of his voluminous correspondence and numerous State papers have been examined, and wherever a significant passage or an important official document has been found it has been classified and placed in this collection. Nothing that has point has been omitted. The matter has been alphabetically arranged by subjects. A reference showing its source accompanies each selection. The text of the most important documents is given in full, the Declaration of Independence being given as it came from Jefferson's hand, including the parts afterwards stricken out by Congress.

By this arrangement one can learn directly just what Jefferson said upon any of the many subjects upon which he spoke. Was he an expansionist? Was he a bimetallist? Was he an infidel? Is the present Democratic platform a re-affirmation of Jeffersonian principles? To these and a hundred other such questions this volume furnishes answers that are beyond controversy.

To make the writings more intelligible a little more than one-fourth of the volume is given to a narrative Life of Jefferson. In this biographic sketch, controversy, abuse and eulogy have been avoided and the facts have been stated in a candid, nonpartisan manner. Dr. W. A. Montgomery, of the University of Mississippi, assisted in the preparation of the biography.

A full index, topically arranged, as in law-books, completes the volume.

Government in Switzerland. By Associate Professor JOHN MARTIN VINCENT. Citizen's Library of Politics, Economics and Sociology, edited by Professor R. T. Ely. Macmillan, x, 370 pages. 1900.

[Extracts from the Preface to the volume.]

The following extracts from the preface of this book give the reasons for the investigation and indicate in part the plan of treatment.

"Switzerland continues to be a perennial source of attraction. More than ever, travellers seek its mountains for scenery and recreation. The most inaccessible peaks of other days are now scaled by cable roads, and the remotest cañons have become the sporting grounds of the nations.

"Almost equally attractive are the peculiar institutions of the country. To a romantic interest in the dramatic portions of its history, there has succeeded a deeper curiosity regarding the political experience of this mountain republic. Intelligent observers have been making known one or another phase of civic life, until a widespread interest in Switzerland has become distinctly discernible in newspapers and political discussion.

"To the American reader the subject is replete with comparisons. The federation of governments is like the union under which he lives. The rights of cantons are the rights for which the states have jealously contended; yet the problems of nation, state, and city have been so differently answered by the Swiss that the closer view is exceedingly instructive.

"To reflecting citizens of all countries Switzerland has a word to say on territorial expansion, on direct legislation by the people, on the nationalization of railways and industries, on the accumulation of wealth, and on other social and economic questions of the day. Hence this book.

"Some years ago the writer published an essay on Swiss government, which was so well received as to encourage him to continue his studies. Since that time many important changes have taken place in state and nation. In order to take note of these and to make the picture more complete, the earlier volume has been subjected to extensive alterations. The order of treatment has been changed, large portions have been rewritten, and much new matter has been added, in the hope that the work will prove useful both to specialist and general reader."

Although Switzerland is a small country, a study of its governments requires an examination of twenty-five constitutions and many laws. Owing to difference of race and language the various regions exhibit individual characteristics in their institutions, making generalizations difficult. A tendency toward uniformity is, however, distinctly visible, and broader functions are steadily acquired by the central government.

An introductory sketch of the constitutional history of the country is followed by a series of chapters on cantonal government. This is the logical beginning of the study, because the cantons were there long before the confederation. The great majority of private rights still remain under the jurisdiction of the states, and the powers of the central government have been slowly wrested from these formerly sovereign bodies. Considerable attention is devoted to taxation and other economic questions, because the same problems are insistently demanding solution in the United States. Legislation is in the hands of the people more than in any country of the world. Only a few of the old folk-motes remain, but a substitute has been found in the Referendum and Initiative, so that in every canton but one the people participate directly in the making of laws.

The Confederation is the crown of the edifice. The name has been in existence since the thirteenth century, but a central government with adequate powers was first reached in 1848. In this the executive is a committee chosen by the legislature, hence feebler than in America. But the Swiss have in other directions entrusted more to the federal authorities, since they control telegraphs, railroads and the manufacture of spirits. Finally the book endeavors to show what use the people have made of their singular legislative powers and what are the possibilities of development for society and for the individual.

Lee's Historical Jurisprudence. New York, Macmillan. 1900.

[From a Review in *The Nation*.]

The following review of a recent work by one of the instructors in the Historical Department, appeared in *The Nation*, New York, November 1, 1900.

"'Historical Jurisprudence,' by Dr. Guy Carleton Lee (Macmillan), is an excellent, and for readers of English the only general, summary of the astonishing results achieved by that historical school of which Savigny and Hugo were the founders. Until recent years the Roman Law, being regarded as the only ancient system in which the growth of highly developed legal conceptions could be traced, has been the chief object of historical study; and thus, as Révillout complains, the *jus gentium* of the Prætors—Maine's 'Roman Equity'—has far too generally passed for an original product of the legal genius of Rome. Dr. Lee's work reminds us that such notions are out of date. Before approaching the civil law of Rome, he surveys the far older legal systems of Babylonia, of Egypt, of Phœnicia, of Israel, of India, and of Greece, and shows us that these were in some respects highly elaborate, and that Rome had much to learn from them. For a knowledge of the ancient civil law of Egypt we have few materials, but as to the early law of Babylonia our information is now both varied and minute. To students like Oppert or Peiser, who can read the will of Sennacherib, or the group of original documents executed in Babylonia prior to the tenth century before Christ, the extant legal records of Rome must indeed seem absurdly juvenile. After a clear account of the growth and maturity of the Roman Law, Dr. Lee traces its influence down to the present day, as shown in the Canon Law, the Barbarian Codes, the early history of the law of England, and the Continental Codes. The book is accurate, as well as interesting. Its statements are at times over-positive, but this is scarcely avoidable in a work so condensed. Its usefulness for students is impaired by the omission of a bibliography, and by the meagreness of the footnotes. With these exceptions the form is on a par with the substance, though we cannot see why the adjective 'Justinianean' should be docked of its last two syllables."

PHILOLOGY.

The Genealogy of the pre-Lutheran Bibles. By W. KURRELMEYER.

[Abstract of a paper read before the University Philological Association, October 19, 1900, and printed in Vol. III of the *Journal of Germanic Philology*.]

The genealogy of the first five pre-Lutheran bibles has been with some degree of certainty determined, the most recent work on this subject being that of W. Walther, *Die deutsche Bibelübersetzung des Mittelalters, Braunschweig 1889*. Walther's treatment is however not systematic, and with regard to the later editions is often insufficient or incorrect. To set forth as far as possible the exact position of each of the later editions is the purpose of this paper, but for the sake of completeness the earlier editions will first be briefly mentioned.

As is well known, there are fourteen editions of the German bible antedating that of Luther, in addition to three Low German ones. These fourteen, and partly also the Low German ones, descend from one translation. The first five editions bear no printed date, but dates written in various copies by rubricators and purchasers, together with other data, serve to fix approximately the year of issue.

The texts of Mentel and Eggensteyn agree very closely, and the priority of Mentel's edition is fixed by a number of instances where Eggensteyn has introduced a more modern word in place of an older one used by Mentel. For example, in Mentel *dextera* and *sinistra* are often translated by *zeswe* and *winster*, while Eggensteyn has *gerechte* and *lincke*. The Munich copy of Mentel has written in it the date 1466, and the date of Eggensteyn is placed by Walther at 1470.

The third edition, that of Pflanzmann, is shown to be a copy of Eggensteyn by the errors which they have in common, and which occur only in these two. The date of Pflanzmann's edition is placed at 1473. The differences between these first three editions are not very great, and they therefore constitute a group.

The fourth edition, ascribed to Günther Zainer, and published at Augsburg about the year 1473, introduces numerous changes and corrections, which are followed by the next four, and these constitute the second group. Zainer 1473 copied from Eggensteyn, as is shown by Walther, cols. 39–48. While Pflanzmann's bible is called the third, and Zainer's the fourth, there is no certainty with regard to this numbering. Zainer is put later because he introduced numerous modernizing constructions.

The fifth is the so-called *Schweizer Bibel*, the name indicating the dialect. It has the old long vowels *î, û, iu* where the other editions have the dipthongs *ei, au, eu*. Date, place and printer are unknown, but one copy has written in it the date 1474. Except in the matter of dialect the text agrees quite closely with that of Zainer 1473. More modern constructions prove the *Schweizer Bibel* to be the later edition. Up to this point my results agree with those of Walther.

The next bibles are those of Zainer 1477 and Sorg 1477. Each of these bears the printer's name and the date, and the question is, did the one copy from the other, and if not, from which of the two immediately preceding editions did each copy? Certain errors and changes peculiar to Zainer 1477, and not occurring in Sorg 1477 prove that Sorg did not copy from Zainer; similarly, certain changes and errors introduced by Sorg 1477 and not shared by Zainer 1477 show that Zainer did not copy from Sorg. We must therefore look for the source of each in one of the two immediately preceding editions. The *Schweizer Bibel* is excluded by the fact that it contains numerous errors and corrections, none of which appear in the two editions in question or in any of the subsequent ones, so that the *Schweizer Bibel* can be at once eliminated from the discussion. Both Zainer 1477 and Sorg 1477 are therefore copies of Zainer 1473.

Walther is silent concerning the source of Zainer 1477, but states that Sorg 1477 copied from the *Schweizer Bibel*. His judgment is based on a single instance, Hab. 3, 6, where both the *Schweizer Bibel* and Sorg 1477 omit the words *der welt*, while Zainer 1473 includes them. There are, however, different copies of Zainer 1473, a fact which Walther failed to take into account here, though noting it in his bibliography. At Wernigerode I found two copies of Zainer 1473, one of which has the words *der welt*, as Walther states, while the other omits them. The latter copy is in one volume, and I have designated it as 1473^a; the other copy is in two volumes, and this I have designated 1473^b. The omission of *der welt*, being common to Zainer 1473^a, the *Schweizer Bibel*, and *Sorg 1477*, can therefore not be used as a criterion. Consequently there is not a single instance conflicting with the statement made above, that Sorg 1477 copied from Zainer 1473^a. Zainer 1477 copied from Zainer 1473^b, both having correctly the words *der welt*, Hab. 3, 6. As to the relative priority of Zainer 1477 and Sorg 1477, we can come to no conclusion from a study of the text.

The eighth edition is that of Sorg 1480. Walther ventures no statement as to the origin of this, the second edition of Sorg. One might expect that Sorg used his own first edition of 1477 as the basis of his second, but such is not the case. A number of changes made by Zainer 1477 and copied by Sorg 1480 show conclusively that the latter descends from the former. This is the last of the second group of texts.

The third and last group begins with the edition of Koburger, which appeared in 1483, the year of Luther's birth. Numerous corrections are introduced, and these are followed with only slight deviations by all the later editions. As possible sources of Koburger's edition we have the texts of the preceding group, from Zainer 1473 to Sorg 1480. The *Schweizer Bibel* was eliminated above. The series Zainer 1473^b, Zainer 1477, Sorg 1480 is eliminated by common changes and errors which do not occur in Koburger's text. There remain consequently only Zainer 1473^a and Sorg 1477. A number of omissions and additions of Sorg 1477 which are not found in Koburger, prove that the latter followed Zainer 1473^a.

The tenth bible, that of Strassburg 1485, was printed from Koburger. No detailed proof is necessary, as the dates are fixed, and Koburger's emendations are shared by the later edition.

The Schönsperger bible of 1487 comes next in order. Either of the two preceding editions could be the source of this one; the Strassburg bible contains, however, so many changes not found in any succeeding edition, that it, like the *Schweizer Bibel*, can be left out of account in examining those editions. Koburger 1483 is therefore the immediate source of Schönsperger 1487.

In 1490 Schönsperger issued his second edition, and numerous readings show that he used, not his own first edition, but that of Koburger 1483. The next bible, however, that of Hans Otmar 1507, does share the changes and errors of Schönsperger 1487, but there are also instances where the mistakes of Schönsperger 1487 are not followed. In the passages in question, Otmar, with a single exception, agrees with Koburger and Schönsperger 1490 and on this account one might be inclined to conclude that Otmar used one of these editions to correct the text of Schönsperger 1487. But in the passage II. Ezra 6, 10, Schönsperger 1487 omits the clause *das sie dich tödten, und sein künfftig*, because it is repeated immediately after in nearly the same words. Here also Otmar supplies the omission, but not in the very words of Koburger and Schönsperger 1490, as just quoted: Otmar here reads *dich zū ertödten und seind künfftig*, and hence it might appear that he used a Vulgate for his corrections. For the present this question must remain undecided.

The last of the bibles which concern us here is that of Sylvanus Otmar, 1518. All the omissions, additions and corrections of Hans Otmar 1507 are shared by the edition of 1518, which is therefore a copy of the earlier one.

Four years later the appearance of Luther's *September-bibel* marked the beginning of a new epoch. The text of the pre-Lutheran bibles, as I have shown elsewhere, goes back to the fourteenth century, and the corrections of the various publishers, numerous as they were, did not suffice to make it a modern, living translation. This was first done by the version of Luther.

The Æsopic Fable in Spain and Portugal during the Middle Ages.

By GEORGE C. KEIDEL.

[Abstract of a paper read before the University Philological Association, November 16, 1900.]

The manuscript treasures of Spanish and Portuguese libraries are still for the most part unexplored, and so we find very few Æsopic fable manuscripts indicated for the Iberic peninsula in M. Léopold Hervieux's colossal publication on the Latin fabulists down to the close of the Middle Ages (*Les Fabulistes Latins*, Paris, Firmin-Didot et Cie., 1884–1899, 7 vols.).

Greek fable literature was probably known on the peninsula during the Greek, Carthaginian and Roman periods, but has left no record of itself. Amador de los Rios, *Historia Crítica de la Literatura Española*, Madrid, 1863, Vol. III, p. 471, wrongly claims the Spaniard Hyginus as the first Latin fabulist.

It is evident from his *Origines*, Book I, Chap. xxxix, that St. Isidor of Seville was acquainted with both Greek and Latin fable literature, but to what extent remains problematical for us.

The following manuscripts containing collections of Æsopic fables are recorded either as having formerly existed in Spanish and Portuguese libraries, or as being still extant therein:

1. An Avianus manuscript is on record as having been transferred from one Spanish monastery to another in 848 A. D. (Cf. Rud. Beer, *Handschriftenschätze Spaniens*, Vienna, 1894, p. 20.)
2. Madrid, Bibl. Nacional, Aa. 163, dating from about 1325 A. D. and containing the collection of Walter of England.
3. *Æsopus Latine* in public library of Valencia, MS. 185, probably the collection of Walter of England.
4. Madrid, Bibl. Nacional, 110, a mutilated manuscript of Walter of England.
5. *Quesopete en Latin*, in inventory of D. Alvar Garcia de Santa Maria of Burgos in 1460. ("16. Otro librete que es quesopete en papel en latin cobierto de prieto.")
6. *Ysopet de Laxaga*, in inventory of Mosen Pierres de Laxaga before 1461. ("4. Item un Romanz Isopet.")
7. *Ysopet de Viane*, in inventory of D. Carlos de Aragon, Príncipe de Viana, at Barcelona in 1461. ("60. Item Isop en frances.")
8. Madrid, Academia de la Historia, 45, a Walter of England manuscript with the subscription in an Italian hand: "Bononie G. Monet. Scripsit 1476."
9. *Æsopus en Griego*, probably a manuscript presented to the Bibl. Universitaria of Salamanca in 1497 by D. Alonso Ortiz, a Canon of Toledo.
10. *Libro de los Gatos*, a translation of Odo of Sherington extant in a manuscript not definitely indicated by the editor D. Pascual de Gayangos in the *Bibl. de Autores Españoles*.

BIOLOGY.

The Study of Marine Biology at Beaufort. By ETHAN A. ANDREWS.

In the *American Naturalist* for May, 1900, Professor H. V. Wilson gives an account of the new marine station at Beaufort, N. C., which has been so successful under his guidance in its first two years. The establishment of this station by the U. S. Fish Commission is of interest both in itself and as the culmination of a long chain of events. When Louis Agassiz threw himself into the study of the Natural History of North America, the northern centre of culture, Boston, claimed the larger share of his activities, but it is not forgotten that the Athens of the South gave him aid and welcome. When he at last founded his sea-side school at Penikese, on the rocky shores of New England, he planted the seeds that have at length developed on the sandy coasts of the Carolinas. His student, W. K. Brooks, for the Johns Hopkins University, initiated in 1878 the first American laboratory for research in Southern waters. After a few years of trial had shown that the Chesapeake was not the ideal locality for such work it was natural that the first good harbour south of that should have been tried. The work of Agassiz and of McCrady, at Charleston, and the richness of various collections made at Beaufort, N. C., pointed out the possibilities of these sandy shores, and the Johns Hopkins Laboratory demonstrated their richness and availableness for the solution of scientific problems. This laboratory, so generously supported by the trustees of a University in the South, sought to develop a knowledge of the marine life of that region rather than to turn North where more comfortable and wholesome shores were known to be easily found.

At Beaufort the University liberally aided students of Natural History who carried on studies in the structure, habits and physiology of marine animals, year after year. When this aid could no longer be given (owing to financial disaster), it was found best to make occasional expeditions to the even richer seas of the Bahamas and of Jamaica, in the hope that the solution of special problems thus attempted would offset the disadvantages of inability to maintain a permanent working place and outfit: inexpensive expeditions took the place of a continuous and expensive marine station. Yet Beaufort was revisited from time to time, and former students, now leaders in biology in other sections of the country, came with their students, now and then. One of these, H. V. Wilson, Professor of Biology in the University of North Carolina, has been fortunate enough to convince others of the value of a permanent marine station at Beaufort, both as a centre for the advancement of pure science and for the furtherance of the economic welfare of the State of North Carolina. The work of Professor Brooks and that of Lieutenant Winslow had shown the possibilities of oyster culture in this region and when the U. S. Fish Commission decided to develop the fisheries of the South as well as those of the North and West it was natural that attention should be directed to Beaufort as a favorable site for a permanent station.

Somewhat in the same manner the work of Professor Verrill and of Professor Smith, at Woods Holl, led up to the selection of that region as the first headquarters of the U. S. Fish Commission.

Beaufort lies on a small harbour, opening out to the Atlantic on the coast south of Cape Hatteras somewhat as Woods Holl lies below Cape Cod. Both enjoy access to the Atlantic and the advantages of bays and sounds, and both have that great boon to the zoologist, a surface fauna enriched by the addition of pelagic forms driven from the Gulf Stream by frequent winds. But in all these respects Beaufort has the advantage. On the other hand, the rocks and bowlders of New England are lacking to the endless expanse of sand stretching along the coast of the Carolinas. Rock-loving animals and plants are put to remarkable shifts to gain a foothold upon the shifting sands, but many do manage to exist. The sand-loving forms and the free-swimming forms are excessively abundant, the more so as there is no severe winter to kill them on the shoals. The climate is notably equable, and the temperature of air and of water so much alike, both being high without excessive heat, that eggs and larvæ develop rapidly and easily in the naturalists' aquaria without the dangers of sudden changes.

In his preliminary reconnoissance, Professor H. V. Wilson finds a fauna rich in all kinds of animals. The distinct forms mentioned include: several sponges; a dozen or more hydroids; four or five scyphomedusæ; six sea-anemones; renilla and other alcyonarians; ctenophores; a dozen echinoderms; a score and more of annelids; two-hundred or so molluscs; sixty or more crabs; many ascidians; one hundred and fifty fish; fifty summer birds; lizards, frogs, turtles and the alligator; insects and some other forms not as yet studied. In all these groups many kinds are found breeding in the summer time, supplying abundant material for embryological study.

To study this fauna with success and with a reasonable lack of discomfort a permanent building to house the investigator and a suitable outfit to meet the needs of science, as it now stands, seem to be most necessary. All else is supplied by the region and by the many who are willing and able to work there. The town of Beaufort supplies the needs of a student and presents peculiar attractions all its own. In the words of Professor Wilson:—

"Beaufort itself is a quaint and attractive town, with its wide, grassy lanes, and inclining trees (live oaks, mulberries, elms), which show plainly the direction of the prevailing wind. Viewed from the harbor the town presents a long line of white houses that edge the shore, each with its upper and lower porch, from which (more especially the upper) the harbor in turn offers a very pleasing picture. In the late afternoon, when the glare has become less intense, the picture is one that stays in the memory as a restful composition of sky and water, the latter broken here and there with green marsh islands and white shoals, with sand dunes on the banks and breakers in the inlet shutting in the view. To the eastward big reels, on which seines are wound, make a detail suggestive of the village life. . . ."

"With proper precautions Beaufort is a healthful as well as a pleasant summering place for most people. Morehead City, across the harbor, is a well-known resort in this part of the South, and many people come also to Beaufort. The fishing, sailing, and the daily bath make the days pass agreeably for those who have nothing else to do, and contribute much to the *bien-être* of naturalists who are spending a working vacation. The ocean beach is a hard, fine one, and the surf bathing about like that of the better known Jersey coast. For the regular daily bath, however, most people prefer the harbor. With a skiff, in five minutes, one reaches a clean sand shoal, over which the ocean water is flowing from the inlet opposite, and with the first plunge becomes aware of the pleasure that lies in this part of the day's routine."

In this environment the U. S. Fish Commission decided to plant a marine station having the double object of aiding scientific research, untrammelled and unlimited, and of investigating the oyster and other forms of great economic importance. Professor H. V. Wilson's great interest in the project as well as his former experience as Naturalist in charge of the U. S. Fish Commission laboratory at Woods Holl, Mass., where he carried on his well-known work on the bass, made him the most suitable person to serve as Director of this new station. Under his guidance a dozen men enjoyed the privileges of the hired buildings, boats and apparatus furnished by the Commission from June 1st to September 15th, 1899. These students came from the University of North Carolina, Guilford College, Trinity College (N. C.), Baldwin University, University of Alabama and the Johns Hopkins University.

The success of the experiment was so great that the establishment of a permanent station seemed justified. A bill providing the necessary appropriations was presented in Congress and the project met with the hearty support of many educators and naturalists in the South, West and North. "The policy of maintaining Fish Commission stations, at which ample opportunity is offered for scientific investigation, has been fully justified by the history of the station at Woods Holl. The results of the purely voluntary researches of the naturalists who have annually visited this station are of the highest value. In no way can the Fish Commission accumulate useful information concerning the animal and plant life of a region, so rapidly and at so little expense, as by maintaining a well-equipped laboratory, open to all who come to study the natural history of that region." An appropriation has been obtained and thus Beaufort may hope to be the seat of an observatory for scientific work such as are scattered along all the coasts of Europe, and seen even in Japan. What the University was unable permanently to support and develop, will, we hope grow under the government's protection into a strong aid in the development of the marine industries of the South and an important centre for the advancement of pure science.

The general character of the work done at this station during its second year is indicated in the following note taken from *Science*, Oct., 1900.

"The second season of the Beaufort Laboratory of the U. S. Fish Commission came to an end on September 15th. The occupants of tables were from Johns Hopkins University, Columbia University, University of North Carolina, and Trinity College (N. C.). The economic work, carried on by special assistants in the service of the Commission, embraced a study of the neighboring natural and artificial oyster beds, breeding times and food of certain food-fishes, life histories of fish (blennies), life history of a lepanide barnacle (dichelaspis) which has been found to be a common parasite in the gill chambers of the edible crabs, Callinectes and Menippe. The more purely scientific investigations covered a wide field, embracing such diverse subjects as the systematic zoology and ecology of actinians, echinoderms, and sponges; embryology of ophiurans; larval development of actinians; regeneration phenomena in ophiurans, and in Renilla; embryology of gephyrean worms (Thalassema); cell lineage of Axiothea; experimental work on the cleavage of the oyster egg; cytological phenomena in the 'chemically fertilized' eggs of Toxopneustes."

In this connection it is of local interest to note that Professor H. V. Wilson, the director of this marine station at Beaufort, N. C., is a Baltimorean whose education was obtained at the City College, and at the Johns Hopkins University where he obtained the degree of A. B. and later of Ph. D. He was the first to receive the Adam T. Bruce Fellowship, in 1888, and while holding this was enabled to study at Green Turtle Cay in the Bahamas.

His chief contributions to zoology have been studies on the growth and reproduction of sponges and of fish. Recently he has made contributions toward the solution of the intricate and much discussed problem of the exact origin of the embryo in the frog's egg and the fundamental questions of blastopore closure and of "concrescence." (*Anatomischer Anzeiger*, XVIII, 1900). Another recent paper (American Naturalist, XXXIV, 1900) describes a remarkable new species of fresh water animal, Pelomyxa, found in Carolina, and besides its scientific interest furnishes a method for the rearing of such microscopic creatures that will prove a boon to the teacher of classes in elementary biology who finds great difficulty in obtaining "amœba material."

PHYSICS.

Rapport sur l'Équivalent Mécanique de la Chaleur, par Prof. J. S. Ames. By N. E. Dorsey.

This paper, which was read before the International Physical Congress at Paris during the past summer, contains a concise statement of all the important work that has yet been done with the object of determining the mechanical equivalent of heat.

Before proceeding to a discussion of the work it is necessary to obtain a clear idea of the object in view. One of the most fundamental axioms in physics is that of the conservation of energy. By this we mean that under whatever forms it may be manifest, or however often it may change from one form to another, the sum total of the energy in the universe remains constant. That is, if we transform one kind of energy, say mechanical, into another form, say heat, then the amount of heat produced depends only upon the amount of mechanical energy metamorphosed, and not upon the manner in which the change has been effected. The amount of mechanical energy needed to produce one unit of heat is what is meant by the mechanical equivalent of heat.

But how are we to measure the amount of heat produced? We might do it by the amount of ice that can be melted by it; or by the amount of water that can be raised from t° to $(t+1)^\circ$; or by any other change produced by heat. For various reasons the most useful unit is that amount of heat required to raise the temperature of one gram of water from t° to $(t+1)^\circ$. Now this amount of heat depends not only upon the way our thermometer scale is divided but also upon the kind of thermometer used, whether the ordinary mercury-in-glass, or the air, hydrogen, nitrogen, or platinum thermometer. It was also soon found to depend upon the temperature t at which we are working. Hence, in defining this unit we must specify the temperature and the kind of thermometer used. The amount of work required to raise the temperature of one gram of water from t° to $(t+1)^\circ$ C. is generally spoken of as the "specific heat of water" at t° on the special thermometric scale employed in the experiment.

The most direct method of determining this quantity is to warm water from t° to $(t+1)^\circ$ by mechanical agitation and to measure the amount of work expended. This method has been employed by several observers, the most noteworthy of whom are Joule, Rowland, and Reynolds and Moorby. The next most direct method is to warm the water by passing an electric current through a coil of wire immersed in the water. If we know the resistance of the coil and either the current passing through it, or the electromotive force at its extremities; or if we know both the last two, we can calculate the mechanical equivalent of the electrical energy expended, and so obtain the value of the specific heat of water. The best work by this method has been done by Griffiths, Schuster and Gannon, and Callendar and Barnes. The other methods that have been used, as well as the other observers and the results obtained by them are also given in this report by Professor Ames.

After several less successful attempts, Joule in 1878 determined the specific heat of water by measuring the rise of temperature produced by stirring the water rapidly. The water was contained in a suspended calorimeter and the amount of work done on the water was determined by measuring the couple needed to hold the calorimeter at rest while the water was being stirred. The stirring was done by hand, and mercury-in-glass thermometers were employed. His result, corrected by Schuster to the scale of the Paris nitrogen thermometer, is that

$$4.173 \times 10^7 \text{ ergs}$$

are required to raise one gram of water 1° C. at the temperature of 16.5° C. An erg is very approximately $\frac{1}{980}$ of the work required to raise a mass of one gram through a vertical height of one centimeter at Baltimore.

Professor Rowland of this University in 1878 and 1879 attacked the problem by the same general method. He used several mercury-in-glass thermometers compared directly with a constant volume air thermometer. The stirring was done very regularly by means of a gas-engine, the thermometers were read every degree, or every half-degree, and the time of each reading was recorded, and each experiment was continued until the temperature had been raised some 20 degrees, thus giving a large series of values. He combined his observations in groups of 10 degrees each, and considered $\frac{1}{10}$ of the amount of work required to raise the temperature of one gram of water from $(t-5)°$ to $(t+5)°$, as the specific heat of water at t°. His corrected results expressed in terms of the Paris nitrogen thermometer may be represented between 15° and 25° by the expression

$$C_t = 4.187 \times 10^7 \, [1 - 0.00026 \, (t - 15)] \text{ ergs.}$$

The error in this, as estimated by Professor Rowland, is not greater than two parts in one thousand.

Reynolds and Moorby in 1897 determined by means of a hydraulic brake the mean specific heat of water between 0° and 100° C. Their work, which was done with the greatest accuracy, gives

$$4.1832 \times 10^7 \text{ ergs}$$

as the mean specific heat of water between the above temperature limits.

In 1893, Griffiths employed the electrical method, measuring the resistance of the heating coil, the electromotive force at its extremities, and the time needed to raise the temperature of one gram of water from t° to $(t+1)°$ C. He used a mercury-in-glass thermometer compared through a Griffiths-Callendar platinum thermometer with a Tonnelot thermometer standardized at the International Bureau. After correcting the results for errors in the electrical standards employed, Professor Ames concludes that Griffiths' results give us

$$C_t = 4.190 \times 10^7 \, [1 - 0.000266 \, (t - 15)]$$

for temperature between 15° and 25° C.

Schuster and Gannon in 1894, using the electrical method, measured the electromotive force at the extremities of the coil, the current, and the time. They worked only in the neighborhood of 19° C, and their result, after all corrections have been applied is

$$C_{19^\circ.1} = 4.185 \times 10^7 \text{ ergs.}$$

Callendar and Barnes, using a modification of this method find, between the temperature of 4° and 60° C.,

$$C_t = C_{40} \, [1 + 0.0000045 \, (t - 40)^2].$$

They give no absolute value, but their diagram indicates that

$$C_{40} = 4.179 \times 10^7 \text{ ergs.}$$

After applying probable corrections for the electrical standards employed, this becomes

$$C_{40} = 4.171 \times 10^7 \text{ ergs.}$$

Reduced to a uniform temperature of 20° and the scale of the nitrogen thermometer, Professor Ames finds, after all probable corrections have been applied, the following values:—

Joule, - - - - - -	4.169×10^7 ergs.
Rowland, - - - - -	4.181×10^7 "
Griffiths, - - - - -	4.184×10^7 "
Schuster and Gannon, - -	4.181×10^7 "
Callendar and Barnes, - -	4.178×10^7 "

The mean of the last four is

$$C_{20} = 4.181 \times 10^7 \text{ ergs,}$$

which it is interesting to note is exactly the value found by Professor Rowland.

A paper entitled "On the Capacity for Heat of Water between the Freezing and Boiling Points, together with a Determination of the Mechanical Equivalent of Heat in Terms of the International Electrical Units," by Dr. H. T. Barnes, and published in the Proceedings of the Royal Society, Vol. 67, pp. 238–244, November 14, 1900, contains a summary of the complete work of Callender and Barnes, and gives as a result of their work $C_{20} = 4.1838 \times 10^7$ ergs, or correcting for the probable error in the Clark cell

$$C_{20} = 4.1817 \times 10^7 \text{ ergs.}$$

This is a trifle higher than the value assigned by Professor Ames, and raises the mean of the last four values given in the table to

$$C_{20} = 4.182 \times 10^7 \text{ ergs.}$$

It appears from this work that we now know the specific heat of water at 20° C as accurately as the electromotive force of the Clark cell is known.

The last part of Professor Ames' report is taken up with a discussion of the heat of fusion of ice and that of the evaporation of water; and shows that these quantities are not at all exactly known. Hence the unit of heat as defined by the specific heat of water is practically by far the best.

December 15, 1900.

A Notice of the U. S. Coast Survey's Transcontinental Triangulation.

By N. E. Dorsey.

The above is the title of a large quarto volume of nearly nine hundred pages, which has been recently issued by the United States Coast and Geodetic Survey, and which contains the results of the measurement of the length of the 39th parallel of latitude, between Cape May lighthouse on the Atlantic coast and the lighthouse on the Pacific at Point Arena, California, a total distance of 2,625 statute miles corresponding at this latitude to an arc of 48° 46′.0 of longitude. An idea of the accuracy of the work may be obtained from the statement that the probable error of the entire distance is only about 85 feet. This is the most extensive piece of goedetic work yet attempted by any nation, and yields, in addition to new material for the calculation of the figure and size of the earth, (its most important result from a scientific point of view), fixed points of known geographical position in sixteen states. On account of the great extent of the survey and the varied nature of the country traversed many new geodetic problems, relating to instruments, methods, and reduction of observations, were involved. As an instance of the new methods employed we may mention that in the flat central portion of the country the theodolites were mounted on scaffolds, some as high as 152 feet above ground, and observing poles even so high as 275 feet were used so as to overcome the curvature of the earth and keep the line of sight sufficiently elevated above the ground.

The work was begun under Professor Benjamin Peirce, in July, 1871, and the actual observations were concluded in 1898. The computations were under the charge of Mr. C. A. Schott; and the present Report stands practically as submitted by him. The publication of the Report is one of the most noteworthy achievements of the administration of Professor H. S. Pritchett, late Superintendent of the Survey. Up to 1897 the cost was $500,000, exclusive of salaries of officers; the cost per mile varied from $103 in Maryland and Delaware to $463 in California; the average expense of occupying one station in the former section was $598, in the latter $9,031; the sizes of the triangles varied from those in the western section with sides over 100 miles long, to those in the central section with sides of only 17 miles.

The International Congress of Physics, Paris.

An extract from a letter of Professor Henry Crew.

"Considered as a whole, it was the most carefully planned and most excellently managed affair of the kind that I have ever attended. At the opening session, Cornu had before him on the table three octavo volumes containing what was practically the printed minutes of the conference about to be held. Meetings were held at the appointed times and places. Reprints were distributed gratuitously on the day the paper was read. Everything was in French save only the papers by Kelvin and Boys.

"The contents of these three volumes you know as well as I. In my mind the *Report* of this conference and Winkelmann's *Handbuch* complement each other; the two together forming a superb compendium of modern physics.

"The afternoon and evening attractions were unusually interesting to me. Among them was a brilliant lecture by Curie on *Radium* and an equally brilliant one by Cornu on *Velocity of Light.* Two other afternoons were filled by visits to the Sorbonne and to the Eiffel Tower. The reception given by Prince Roland Bonaparte was made exceedingly attractive by bringing together in his library, not only an interesting group of men and women, but also a collection of the best scientific novelties of the Exposition.

"At the close of the Conference a standard pressure of 75 (instead of 76) cm. of mercury—or rather a megadyne per cm.^{2}—which is 75 cm. mercury—was adopted and named the *barye* or *barie*—I do not know which—have seen both spellings. Guillaume used *barye* in his paper.

"Webster made a neat and happy little speech in French at the last meeting—alluding among other things to 'universal peace' as a *fait accompli* among men of science.

"Among the most interesting things at the Exposition were the recording telephone recently described in *Nature*:—the Parson's steam turbine, same engine that is used in the *Turbinia:* Rowland's Multiplex: Nernst's Magnesium oxide lamp: and the superb optical and mechanical exhibit of the Germans."

STUDIES IN HISTORICAL AND POLITICAL SCIENCE.

Prospectus of Nineteenth Series, 1901.

The following University Studies in Historical and Political Science, under the editorial direction of Professor Herbert B. Adams, are announced for the year 1901 and will be published at convenient intervals. The cost of subscription for the regular Annual Series, comprising about 600 pages, with index, is $3.00. Single numbers, or special monographs at special prices.

STATE ACTIVITIES IN RELATION TO LABOR IN THE UNITED STATES. By W. F. Willoughby.

1. Introduction.
2. Bureaus of Labor.
3. Employment Bureaus.
4. Inspection of Factories.
5. Inspection of Mines.
6. Regulation of Sweating System.
7. Boards of Arbitration and Conciliation.

AMERICA IN THE PACIFIC AND THE FAR EAST. By J. M. Callahan.

LIFE OF COMMISSARY JAMES BLAIR, FOUNDER OF WILLIAM AND MARY COLLEGE. By D. E. Motley.

HISTORY OF SUFFRAGE IN VIRGINIA. By J. A. C. Chandler.

THE MARYLAND CONSTITUTION OF 1864. By W. S. Myers.

GOV. HICKS OF MARYLAND AND THE CIVIL WAR. By G. L. Radcliffe.

Other numbers may be announced from time to time.

An extra and supplementary number containing a Bibliography of Publications by Graduates and Members of the Department of History, Politics and Economics of the Johns Hopkins University from 1876–1900, will also be issued.

JAMES EDWARD KEELER.

By Professor W. W. Campbell,
Director of the Lick Observatory.

[Reprinted from the *Popular Science Monthly*, November, 1900.]

The Lick Observatory has lost an ideal director. Astronomy has suffered a loss it can ill afford. Colleagues and friends widespread will miss a companionship which was simply delightful.

James Edward Keeler was born in La Salle, Ill., on September 10, 1857. Ralph Keeler, his first American ancestor, settled in Hartford in 1635. His father, Wm. F. Keeler, was an officer of the original 'Monitor' at the time of its engagement with the 'Merrimac.' His mother (still living) is the daughter of Henry Dutton, former Governor of Connecticut and Dean of the Yale Law School.

In 1869 the family removed from La Salle, Ill., to Mayport, Fla. Here Keeler prepared for college, under the tutelage of his father and elder brother. Here his fondness for astronomical studies was developed. He established 'The Mayport Astronomical Observatory' in 1875–77. It included, at the least, a quadrant, a two-inch telescope, a meridian circle and a clock. Under date of 1875, September 22, his journal records an observed altitude of *Polaris* secured with 'my quadrant.' Other entries read:

"1875, November 14. Sent to Queen last night for lenses for my telescope."

"1875, November 29. Lenses from Queen came to-night; one two-inch achromatic, and two plano-convex lenses for eyepiece."

"1875, December 12. Directed my telescope to the stars, and saw the rings of Saturn for the first time. . . ."

"December 14. Saw the Annular Nebula in Lyra. One satellite of Saturn. . . . All four of the stars in the Trapezium. . . ."

"1876, January 26. Got up at half-past four this morning and applied my telescope to Jupiter for the first time. . . ."

In 1877, at the age of twenty years, he constructed a meridian circle instrument. The telescope was that of a common spyglass, 1.6-inch aperture and 13.45-inch focus. The axis was turned out of wood. Brass ferrules, driven on the ends of the axis and turned down, formed the pivots. The wooden circle, 13.3 inches in diameter, was graduated to 15′.[1]

His 'Record of Observations made at the Mayport Observatory' contains beautiful colored sketches of Jupiter, Saturn, Venus, Mars, the Orion Nebula, of double stars and of 'Scenery on the Moon;' and in addition, data of a numerical character. These early drawings are characterized by the refined taste and skill so well known from his later professional work.

Keeler entered Johns Hopkins University late in 1877; and, following major courses in physics and German, he was graduated with the degree of A. B. in 1881. At the end of his freshman year he accompanied Professor Hastings, as a member of Professor Holden's party from the Naval Observatory, to observe the total solar eclipse of July 29, 1878, at Central City, Col. Although his part was the modest one of making a drawing of the corona, his written report on the work is a model scientific paper, and may be read with profit by visual observers of eclipses.

In the spring of 1881 Professor Langley, desiring an assistant in the Allegheny Observatory, requested the Johns Hopkins University to recommend a suitable man for the place. Keeler was named and accepted the appointment, beginning work at Allegheny several weeks before receiving his degree. I was speaking in June of this year (1900) with one of the physicists who had recommended Keeler for the Allegheny position, and the subject of the very appointment came up. "I told Professor Langley," said he, "that one of my strongest reasons for the recommendation is that Keeler doesn't claim to know everything." To the end of his life this charming trait remained unimpaired. It is to Keeler's credit that he largely defrayed his own expenses in college by acting as assistant to some of the lecturers in the experimental courses.

Professor Langley made his noted expedition to the summit of Mt. Whitney, Cal., in June–September, 1881, to determine the value of the 'Solar Constant.' Keeler accompanied the expedition in the capacity of assistant, and carried out his share of the program with skill and efficiency. Returning at once to Allegheny, his work until May, 1883, was closely related to the many problems arising from the Mt. Whitney expedition.

The year 1883–84 was devoted to study and travel abroad. The months of June, July and August, at Heidelberg, were given to the study of light and electricity under Quincke, chemistry under Bunsen, and integral calculus under Fuchs. In the winter semester in Berlin he heard the lectures on physics by Helmholtz and Kayser, on differential equations by Runge and on quaternions by Glan. His main investigation in the physical laboratory was on 'the absorption of radiant heat by carbon-dioxide'—a problem suggested no doubt by his Mt. Whitney experiences.

From June, 1884, to April, 1886, Keeler again served as assistant in Allegheny Observatory, affording most efficient help to Professor Langley in his classical researches on the lunar heat and on the infra-red portion of the solar spectrum.

Early in 1886, on Professor Holden's recommendation, Keeler was appointed assistant to the Lick trustees. He arrived at Mt. Hamilton on April 25, 1886, and immediately proceeded to establish the time service. The telegraph line to San José was perfected, the transit instrument, the clocks and the sending and receiving apparatus at both ends of the line were installed. The signals were sent out on and after January 1, 1887, north to Portland, east to Ogden and south to San Diego and El Paso. In addition to the time service, he assisted the trustees in installing the various instruments.

When the observatory was completed and transferred to the regents of the University of California, on June 1, 1888, Mr. Keeler was appointed astronomer: the original staff consisting of Astronomers Holden, Burnham, Schaeberle, Keeler, and Barnard, and Assistant Astronomer Hill.

Professor Keeler was placed in charge of the spectroscopic work of the observatory. The large star spectroscope, constructed mainly from his designs, has no superior for visual observations. Of the many results obtained with this instrument we may mention the observations of Saturn's rings and Uranus, with reference to their atmospheres; of the bright and dark lines in the spectra of γ Cassiopeiæ and β Lyræ; of the color curve of the 36-inch equatorial, and of the spectra of the Orion Nebula and thirteen planetary nebulæ.

His beautiful observations on the velocities in the line of sight of these fourteen nebulæ mark a distinct epoch in visual spectroscopy. His memoir on the subject took its place as a classic at once. The probable error of the final result for each nebulæ, based on the mean of several observations, is only 3.2 kilometers per second. Attention should be called to one extremely important fact established by these measures, viz., the velocities of the nebulæ in their motion through space are of the same order of magnitude as the velocities of the stars.

The recognition of the fact that a great refracting telescope is also a most powerful spectroscope for special classes of objects, by virtue of the chromatic aberration of the objective, is due to Professor Keeler. Among the first objects observed with the 36-inch equatorial were the planetary nebulæ and their stellar nuclei. The observers were struck with the fact that the focal length for a nebulæ is 0.4 inch longer than for its stellar nucleus; a discrepancy which Professor Keeler at once explained by recalling that the star's light is yellow, whereas that of the nebulæ is greenish-blue.

Astronomical readers will remember Keeler's splendid drawings of the planets Saturn, Jupiter and Mars, made with the assistance of the 36-inch telescope during 1888–90. His faithful and artistic drawings of Jupiter have no equal.

He was in charge of the very successful expedition sent by the Lick Observatory to Bartlett Springs, Cal., to observe the total solar eclipse of January 1, 1889.

Professor Keeler resigned from the Lick Observatory staff on June 1, 1891, to succeed Professor Langley as director of the Allegheny Observatory, and professor of astrophysics in the Western University of Pennsylvania. The Allegheny Observatory has perhaps the poorest location of any observatory in this country for spectroscopic work. But in spite of this disadvantage Keeler's investigations continued and promoted the splendid reputation established for the observatory by his predecessor. He comprehended the possibilities and limitations of his situation and his means, and adapted himself to them. His spectroscopic researches were largely confined to the orange, yellow and green regions of the spectrum, since these would be less strongly affected by the smoky sky for which that vicinity is famous.

---

[1] Keeler's original sketch of this instrument and his written description of it will be published in the next number of the 'Publications of the Astronomical Society of the Pacific.'

The Allegheny spectroscope, designed and constructed soon after his acceptance of the position, contained several valuable improvements. The use of three simple prisms in its dispersive train was a departure which has been followed with great advantage in many later instruments. With this instrument he made an extensive investigation of the Orion Nebula and the stars immersed in it, establishing the fact that the nebula and the stars are closely related in physical condition.[1] His beautiful observations of Saturn's rings, proving that they are a cluster of meteorites—myriads of little moons—have never been surpassed in interest in the entire astronomical field. These observations are so well known to every one interested in astronomy that one sentence suffices. He proved spectrographically, using the Doppler-Fizeau principle, that every point in the ring system is moving with the velocity which a moon would have if situated at that distance from that planet. Professor Keeler's main piece of work at the Allegheny Observatory, on the spectra of the third (Secchi) type stars, remains unpublished, but the measures and reductions are left in an advanced stage.

The regents of the University of California appointed Professor Keeler to the position of Director of the Lick Observatory on March 8, 1898. The ties which bound him and his family to Allegheny were difficult to sever; but the greater opportunities offered by the instruments and the atmospheric conditions at Mt. Hamilton decided him in favor of accepting the appointment. He entered upon his new duties on June 1, 1898.

Without making any rearrangement of the work of the staff, but affording them every possible encouragement to continue along the same lines, Professor Keeler arranged to devote his own observing time to the Crossley reflector. He recognized that the instrument was not in condition to produce satisfactory results. He made one change after another, overcoming one difficulty after another, until, on November 14, he secured an excellent negative of the Pleiades, and on November 16 a superb negative of the Orion Nebula. The enormous power of the reflector in nebular photography was established, and he entered upon the program of photographing all the brighter nebulæ in Herschel's catalogue. More than half the subjects on the program have been completed. The observatory possesses a set of negatives of the principal nebulæ which is priceless and unequaled. These photographs have already led to many discoveries of prime importance; and they furnish a vast amount of material for future investigations of questions bearing especially upon the early stages of sidereal evolution. The photographs record incidentally great numbers of new nebulæ—as many as thirty-one on a single plate covering less than one square degree of the sky. A conservative estimate places the number within reach of the Crossley reflector at 120,000, of which only ten or fifteen thousand have thus far been discovered.

It had previously been supposed that the great majority of nebulæ were irregular and without form, and that only a few were spiral. Professor Keeler's photographs have recorded more spiral nebulæ than irregular ones. This discovery bears profoundly on theories of cosmogony, and must be considered as of the first order.

It is time to refer to Professor Keeler's work as director. I but faintly reflect the views of every member of the staff, and indeed of all who have been interested in the work of the observatory, when I say that his administration was completely successful. He cherished and promoted ideal conditions in this ideal place. He made a success of his own work in a splendid scientific manner, and he saw to it that every one had all possible opportunities to do the same. No member of the staff was asked to sacrifice his individuality in the slightest degree. Nor were demands made for immediate results: no one's plans were torn up by the roots to see if they were growing. The peace of mind of the investigator, so absolutely essential for complete success, was full and undisturbed. Withal, Professor Keeler's administration was so kind and so gentle — and yet so effective — that the reins of government were seldom seen and never felt.

The elements of his success are simple and plainly in view. His openness and honesty of character, his readiness and quickness to see the other man's point of view, his strong appreciation of the humorous as well as the serious, and above all, his abounding good sense—these traits made his companionship delightful and charming. Scientifically Professor Keeler never groped aimlessly in the dark. He would not attack a problem until he had as fully as possible comprehended its nature and the requirements for success. With the plan of attack completely considered, and the instruments of attack at hand, the execution of his plans involved little loss of time. The Crossley reflector affords a case in point. Assisted by a fellow in astronomy and by the instrument-maker, he devoted five months to preparing the reflector for turning out the magnificent results which at once followed.

Professor Keeler's published papers have a finish and a ripeness which are rarely seen. His love of the beautiful and his artistic skill are evident in all his work.

To speak of the people who had afforded him encouragement at different times in his life was one of his pleasures. His father's friend, Mr. Charles H. Rockwell, of Tarrytown, was constant in urging the development of so promising a career. He did not forget Professor Hastings' continual kindness and interest during his college days. He frequently spoke of the great value of Mr. William Thaw's interest and encouragement, both to himself and to the Allegheny Observatory; an interest which was continued after Mr. Thaw's death by other members of his family.

The honorary degree of Sc. D. was conferred upon Professor Keeler in 1893 by the University of California. He received the Rumford Medal from the American Academy of Arts and Sciences in 1898 and the Henry Draper Medal from the National Academy of Sciences in 1899. He was a member of the National Academy of Sciences, an Associate of the American Academy of Arts and Sciences, a Fellow and Foreign Associate of the Royal Astronomical Society, a Fellow of the American Association for the Advancement of Science, a member and officer of the Astronomical and Astrophysical Society of America, an honorary member of the Toronto Astronomical and Physical Society, the president of the Astronomical Society of the Pacific, a member of the Washington Academy of Sciences, and of various other organizations. Professor Keeler was an associate editor of 'Astronomy and Astro-physics' during 1892–94, and editor with Prof. George E Hale, of the 'Astrophysical Journal,' since 1895.

It appears that Professor Keeler had long been a mild sufferer from heart weakness; to run even fifteen steps caused him great physical distress. It is feared that on Mt. Hamilton he worked beyond his strength. His weakness seemed to develop rapidly this summer. He went away from the observatory on July 30, in the best of spirits and with no anxiety, to secure medical treatment and to spend a brief vacation in the northern part of the State. Increasing difficulty in breathing led him to seek skilled treatment in San Francisco on August 10. His dangerous condition was recognized on the 11th, and on the 12th a stroke of apoplexy proved fatal.

Professor Keeler married Miss Cora S. Matthews, at Oakley Plantation, Louisiana, on June 16, 1891. Of her great sorrow and of the grievous loss to the two children it would be futile to speak.

When the dangerous weakness of his heart was discovered by the physicians, Professor Keeler's main regret was that he would have to leave Mt. Hamilton and its opportunities in order to live at a lower altitude. It is known that he had planned his work with the Crossley reflector far into the future. A small spectroscope which he was most anxious to employ on certain interesting spectra was completed on the day of his leaving the observatory.

The absence of one so old in experience and so ripe in judgment will be seriously felt throughout his profession.

In the *Evening Post*, New York, November 24, 1900, Professor Harold Jacoby, of Columbia University, in an article on "Saturn's Rings," states that conclusive visual evidence as to their composition was obtained only recently by Keeler. Professor Jacoby gives a detailed review of Keeler's remarkable spectroscopic observations, which he considers among "the most interesting and significant of recent advances in astronomical science."

Very interesting notices of Professor Keeler's work have also appeared in the *American Journal of Science*, October, 1900, and in *Nature*, September 20, 1900.

---

[1] Simultaneous observations of the same object made at another observatory led to the same conclusion.

THE JOHNS HOPKINS UNIVERSITY AND THE SOUTH.

[From *The Evangelist*, New York, March 29, 1900.]

* * * * * * * * * * * *

Though all sections have thus shared alike the benefits of her pioneer work for higher aims and attainments in American education and scholarship, it is doubtful if anywhere the impulse given to intellectual and material development has been more deservedly appreciated or more zealously cultivated than in the South. The natural advantage of proximity, and the rapid economic growth of an era of peace, which restored her ability to seek again, as formerly, the higher instruction of her youth within her own bounds, led to a quick appreciation in this region of the unusual opportunities offered, for the first time in America, by the Johns Hopkins, and to a constantly increasing stream of young men to her doors.

The date of the opening of the university, 1876, and the years following became as significant of the renewed *educational* South as they were of the political and economic. The breathing space in which the old and dismantled universities of the South were struggling to regain their vigor was the opportunity for their newly created and fresh young leader, whom they soon learned to regard not as their rival, but as their inspiration and exemplar. The State of Maryland, in twenty-three years, has sent to her 1,455 students, and together with the rest of the South nearly 2,000 of the total of some 3,600. Such has been the fulfilment of the President's promise, in his inaugural address in 1876: that the university's influence should be "first local, then regional, and then national," that it should be in truth as the heraldic legend on its shield now proclaims, "An institution devoted to learning, both literary and scientific, in the state founded by Lord Baltimore."

These were not meaningless phrases. Independent of its environment as the university was with its magnificent endowment, he chose from the South, first the men who were to represent this dual idea of the university system, Gildersleeve and Sylvester, former professors in the University of Virginia, fitly symbolizing the realization in Maryland of the Jeffersonian ideal of higher instruction conceived for Virginia. From that day *fitness*, not sectional, religious or political affiliation has remained the criterion of selection. Without sectional discrimination, Newcomb, Elliott, Browne and other Southern men were called to her faculty, and the present staff of instruction contains no less than forty men of Southern origin or connections, about the same number of Northern, and a similar representation from the West and foreign countries. This result, though without design, shows the broad liberality that governs the administration, and the creative work the university is doing for the South as well as for the rest of the country. It was here that the literary genius of Sidney Lanier first found appropriate recognition in appointment to a lectureship and in the much-needed encouragement from Mr. Gilman. We might mention, too, Woodrow Wilson of Princeton, and William P. Trent of Barnard, as typical of her contribution from the South to the North.

The university will not be the first to disregard the bonds of local attachment that are strengthening year by year. As a Maryland foundation; a "Baltimore experiment;" with locally invested funds financiered by Marylanders; endowed with buildings, lectureships, fellowships and scholarships by local friends; reclaimed from financial embarrassment, twice by private and once by public aid in Maryland, she has striven never merely to balance the account but to return a hundred-fold the benefits received. That her return to the state and to the South alone has made her one of the best paying investments ever secured no one familiar with the facts for a moment doubts.

A few of these contributions will be found suggestive: 1. More than any other influence the Johns Hopkins University has checked the exodus of youth to foreign universities—a custom dating from colonial times at the South—by offering them not only equal facilities, but a training more American and more suited to our Southern needs. In the past year 239 out of a total of 465 advanced students have been enrolled from the South. 2. The poor but deserving young men of this region have been aided financially and with honors more largely even than those of other regions. The benefits of 45 scholarships out of a total of 70 are limited to the South, and her sons compete on equal terms for the other twenty-five and for twenty fellowships. Over 260 Southern men have received such or greater honors here. 3. Southern Colleges and schools have been filled with men trained in the best methods of modern research and instruction, who are an inspiration to their students and instrumental in organizing associations for the advancement of the educational and material interests of their respective States. Nearly 200 former students of Johns Hopkins are at present teaching in the South, distributed in every state and among more than 65 institutions. Two hundred more are engaged in business or professional work in the South. 4. The development of local industries of the highest importance, such as oyster culture in Maryland and Virginia, has been greatly stimulated. A marine laboratory is maintained for the study of the life of the Chesapeake and of Southern waters. A physical analysis of soils has been of great agricultural value. The geological department has accomplished much for the farmer, promoter, investor and land-owner in determining soil characteristics, water-power facilities, transportation conditions, the location of mineral resources and in publishing and distributing its excellent topographical map and reports for Maryland. 5. The Medical School, aside from the inestimable benefits of its great hospital and trained men and women, has undertaken researches with good results upon the fatal diseases prevalent in this and Southern regions, such as fevers. 6. The first serious attempt on a large scale to insure the preservation of the history and literature of the South as written by her own people, has been made through the historical department, which has published more than 20 monographs of original research upon Maryland alone, and 61 upon Southern history, economics, and politics. It has the best collections and library facilities in this field of any American university, and it supplements these by courses of systematic instruction in Southern history and economics. 7. The bonds between Baltimore and the South, weakened by the rise of new commercial towns and ports, have been greatly strengthened through the University's influence; and her twelve periodical publications bear the name of Baltimore and Maryland to the whole civilized and educated world. 8. Important principles of the Johns Hopkins system have been copied in many of the Southern Universities; the requirements for the doctorate, the expansion of advanced or graduate study, the system of advisers which insures a personal direction for the undergraduate and finally, a reliance upon the vital and essential: youth, vigor, enthusiasm, reality and the present, rather than upon dim tradition and authority.

JAMES CURTIS BALLAGH.

It is proposed to begin the publication at an early day of THE GEORGE HUNTINGTON WILLIAMS MEMORIAL LECTURES on THE PRINCIPLES OF GEOLOGY.

These lectures, dealing with the Principles of Geology, are given from time to time at the Johns Hopkins University by geologists of international reputation. A fund has been provided by the generosity of Mrs. Williams, who thus commemorates the name and work of her husband, formerly Professor of Inorganic Geology in the Johns Hopkins University, who died in 1894.

The lectureship was inaugurated in April, 1897, by *Sir Archibald Geikie, Director-General of the Geological Surveys of Great Britain and Ireland*, who delivered six lectures on *The Founders of Geology.*

A second course was given in April, 1900, by *Professor W. C. Brögger, of the University of Christiania, Norway*, who delivered two lectures on *The Principles of a Genetic Classification of the Igneous Rocks*, followed by five lectures on *The Late Geological History of Scandinavia, as shown by changes of level and climate since the close of the glacial epoch.*

It is anticipated that other geologists of distinction will be invited from time to time to lecture before the Johns Hopkins University on the broader problems of geology to which they have devoted their attention. The volumes will thus represent the most advanced ideas regarding the fundamental facts of geological science.

The volumes will be printed on fine book paper and uniformly bound in cloth.

The Johns Hopkins Press will issue immediately a specially authorized and carefully prepared translation of the celebrated work of M. LEVASSEUR on the AMERICAN WORKMAN by THOMAS S. ADAMS, edited by THEODORE MARBURG. It will include 540 pages, octavo. The price of the volume, bound in cloth, will be $3.00.

Among the topics treated at length are The Progress of American Industry in the last Fifty Years; The Productivity of Labor and Machinery; Labor Laws and Trade Regulations; Organizations of Labor; The Strike; Wages of Men; Wages of Women and Children; Factors Determining Nominal Wages; Real Wages and Workmen's Budgets; Present Conditions and Future Prospects of the American Workman.

This volume forms one of the series of Studies in History and Politics, issued by the Johns Hopkins Press. A prospectus of this series will be sent on application.

DEATH OF MR. CHARLES MORTON STEWART.

Mr. Charles Morton Stewart, President of the Board of Trustees, died suddenly at Old Point Comfort, Va , August 13, 1900, in his seventy-second year. He had held the position of a Trustee since 1878, and in 1891 he was made President of the Board, succeeding Judge Dobbin, who, in his turn, had succeeded Mr. Galloway Cheston.

At a meeting of the Board of Trustees, held October 1, 1900, the following minute was submitted:

"During the summer vacation, when his colleagues were absent from home and widely separated, they heard, with great sorrow, that Mr. Charles Morton Stewart, President of the Board of Trustees of the Johns Hopkins University, had died suddenly on the 13th of August, at Old Point Comfort, Va., where he had gone for rest and recreation.

"The Board now desires, at the first meeting after the vacation, to record its sense of the loss which the University has suffered in the death of Mr. Stewart, and the personal sorrow of every one of its members.

"Throughout the twenty-one years of service as trustee—during nine of which he was president of the Board—he was profoundly interested in the University, and never allowed himself to doubt as to the continuance of the success of its great work.

"The kindliness of his nature and his easy and unaffected courtesy charmed all who enjoyed the privilege of his acquaintance, and caused him to be beloved by everyone connected with the University.

"In all the varied relations and associations of his long and active life he was useful and honored; and without exaggeration, it may be said of him that few men have so well, and from so many, deserved grateful and affectionate remembrance.

"In this University his memory will be long cherished."

Mr. Stewart was a devoted friend of this institution, rarely absent from the meetings of the Board, always interested in the public ceremonies, and most attentive to every special duty that was laid upon him. He was generous in his gifts, most hospitable in his courtesies, ever ready to commend the University to the confidence of parents and to the support of those who could give financial aid. In times of anxiety and perplexity he never lost his hope and courage. He could tolerate nothing which would detract from the good name of the University, and by his words, his spirit, and his example, he held up the highest standards and the highest expectations. The collegiate work especially appealed to him, and for the encouragement of essay-writing he repeatedly gave a liberal prize. Five of his sons were here graduated as Bachelors of Arts.

As a merchant,—of a type which is disappearing in the changes of modern commerce,—his business extended to remote countries, and brought him into relations, in person or by correspondence, with leading financial firms in this country and abroad. In the importation of coffee from South American ports, he was of late years largely concerned, and he owned a fleet of several swift sailing vessels which plied between Rio Janeiro and Baltimore.

Mr. Stewart was fond of music, literature, and art. He was interested in public affairs, especially in those that pertained to the welfare of his native city. To the church of which he was a member he was loyally devoted, and his faith bore constant fruit in his life and works. As a friend, a neighbor, an associate, and a colleague, he will be remembered with affection, admiration, and gratitude.

Jesse William Lazear (A. B., 1889; M. D., College of Physicians, New York, 1892; and assistant in Clinical Microscopy, Johns Hopkins Medical School) died in Cuba, September 25, 1900.

At a meeting of the Johns Hopkins Hospital Medical Society, October 16, Dr. W. S. Thayer spoke as follows:

"Before we proceed with the programme this evening, I should like to say a few words about our dear friend Lazear, whose sad death at Quemados, Cuba, on September 25, is so fresh in our minds. Lazear was born just outside of Baltimore thirty-four years ago. He graduated at the academic department of the Johns Hopkins University in 1889, and three years later obtained the degree of M. D. from Columbia University, New York. After this he was an interne in the Bellevue Hospital for two years. After spending the greater part of the year in studying abroad, particularly in Paris, he returned in 1895 and became one of the medical staff of the Johns Hopkins Hospital. In the summer of 1896, Dr. Lazear was married and began the practice of medicine in Baltimore. At the same time, however, he was an assistant in clinical microscopy in the University, and in the laryngological department in the Hospital dispensary. Last winter he obtained an appointment as assistant surgeon in the army with special laboratory duties, and was stationed in Havana. There he soon became interested in the study of yellow fever, and for several months he had been one of the commission appointed by the Surgeon-General for the study of this disease. He had been constantly exposed to infection, and finally, in the course of his duty, contracted his fatal illness.

"Dr. Lazear was a man of few words but keen perception. He was an extremely careful and thorough worker. He kept his own counsel, asked few questions and little help of his associates, but he was a man who, when he started an undertaking, had the ability and enthusiasm to keep quietly at work until he accomplished his end. It was through his excellent work that we were able several years ago to make our first positive *intra vitam* diagnosis of septicæmia due to the diplococcus of Neisser. His valuable studies upon the internal structure of the malarial parasite, which I had the pleasure of bringing before this Society last winter, are remembered by all.

"Personally, he was an exceptionally simple, high-minded and lovable man. He could not have failed to find in a short time a public position in which his unusual merits would have become more generally known.

The following resolutions were unanimously adopted.

"*Whereas*, On the 26th day of September, our beloved colleague and friend, Jesse William Lazear, lost his life in the discharge of his duty as a member of the United States Yellow Fever Commission;

"*And whereas*, His exceptional ability in his profession, his simplicity and modesty as a man, had greatly endeared him to all whose good fortune it was to know him;

"*Be it resolved*, That we, his former colleagues and associates, do hereby express our profound sorrow at the loss, to the community of one whose future was unusually rich in promise, to ourselves, of a dear friend and fellow student;

"*And be it further resolved*, That we express to his wife and family our warmest and most heartfelt sympathy."

Rev. Wiltz Raymond Stricklen (A. B., 1880) died at Phoenix, Arizona, on December 19, 1900, in the forty-second year of his age. He was born in Harford County, Maryland, and entered this University at its opening in 1876. After graduation, he became a clergyman of the Methodist Episcopal Church, and was for several years in charge of churches in Baltimore. At the time of his death he was pastor of the Hamline Methodist Episcopal Church, of Washington, D. C.

The parts concluding Volume Eight of the Johns Hopkins Hospital Reports are just ready. They contain 400 pages, large octavo. They are devoted to a new series of Studies of Typhoid Fever, by Drs. Osler, Thayer, Finney, Cushing, Flexner, Lyon, Mitchell, Hamburger, Dobbin, Camac, Gwyn, Emerson, and Young.

Volume Nine will be devoted to the "Contributions to the Science of Medicine." Dedicated by his pupils to William Henry Welch on the twenty-fifth anniversary of his Doctorate. This volume contains 38 separate papers; 1060 pages, 66 plates and 210 other illustrations.

Volume Four of the Memoirs from the Biological Laboratory has recently appeared. It contains 322 pages and 31 plates, quarto. It is devoted to Morphological Monographs by Drs. Conant, Clark, Drew, Berger, Grave, and Bigelow.

PROCEEDINGS OF SOCIETIES.

Scientific Association.

October 24, 1900.—The annual business meeting was held. The following officers were elected:

President.—Prof. J. S. Ames.
Vice-President.—Prof. H. F. Reid.
Secretary.—Dr. J. E. Gilpin.

November 22, 1900.—One hundred and fifty-second meeting of the Association. The President, Prof. Ames, after a few remarks upon the aim of the Association, introduced Prof. H. F. Reid, who exhibited a Seismograph and described its use; and Dr. T. B. Futcher, who presented "Some Points of Interest in the Metabolism of Diabetes Mellitus and Gout."

December 20, 1900.—One hundred and fifty-third meeting of the Association. President Ames in the chair.

Professor Milton Whitney, of Washington, presented some very interesting features of the work of the Division of Soils of the Department of Agriculture, and showed how a study of the nature of the soil in different sections of the country enabled predictions to be made which have resulted in important changes affecting the tobacco and other industries.

Dr. Dorsey explained the accepted idea of the cause of the blue color of the sky.

Philological Association.

October 19, 1900.—One hundred and eighty-fourth regular meeting. Professor Gildersleeve in the chair. Thirty-two members were present.

The Proverb in Latin Literature. By M. C. Sutphen.
The Genealogy of the Pre-Lutheran German Bibles. By W. Kurrelmeyer.

November 16.—One hundred and eighty-fifth regular meeting. Professor Gildersleeve in the chair. Forty-two members were present.

The Beginnings of Hindu Theosophy. By M. Bloomfield.
The Aesopic Fable in Spain in the Middle Ages. By G. C. Keidel.

December 14.—One hundred and eighty-sixth regular meeting. Professor Gildersleeve in the chair. Forty-two members were present.

Some Irregular Forms of the Elegiac Distich. By K. F. Smith.
Mesopotamian Princesses at the Egyptian Court, 1400 B. C. By P. Haupt.

Historical and Political Science Association.

October 5, 1900.
Formation of Government in Porto Rico. By J. H. Hollander.

October 19.
Federal Government in Switzerland. By J. M. Vincent.
Recent Literature on China. By J. C. Ballagh.
Porter's Industrial Cuba. By G. Cator.
Jones' Economic Crises. By G. E. Barnett.
Adams' American Supremacy. By H. S. Hanna.
Roosevelt's Oliver Cromwell. By V. E. Smith.
Lloyd's "A Country without Strikes." By R. J. Mulford.

November 2.
Historical Jurisprudence. By G. C. Lee.
Social Justice. By W. W. Willoughby.
Jenks' Trust Problem. By P. Hollis.
Macy's Political Parties in the U. S., 1846–61. By W. W. Brander.
Tyler's Cradle of the Republic. By T. J. Stubbs.

November 16.
Revenue System of China. By Alfred E. Hippisley.

December 7.
Scientific Aspects of the Social Economy Exhibit at Paris. By W. F. Willoughby.
Foster's A Century of American Diplomacy. By G. Cator.
Frazer's Pausanias and other Sketches. By R. Garrett.
Theories of Sovereignty since Rousseau. By R. J. Mulford.
Powell's Historic Towns of the Southern States. By M. D. Haywood.
Bullock's Monetary History of the U. S. By O. P. McAuley.

January 4, 1901.
Reports of the Recent Meetings of Societies:—
American Economic Association. By W. W. Willoughby.
American Historical Association. By J. M. Vincent.
Southern Educational Association. By J. C. Ballagh.
Nash's History of Higher Criticism. By P. Hollis.

MARYLAND COLONIAL HISTORY.

The Maryland Society of Colonial Dames of America, by a liberal gift, has enabled the Johns Hopkins University to offer a course of lectures on Maryland Colonial History during the current year.

The lectures, six in number, will be given by Dr. Charles Wm. Sommerville, a graduate and a Fellow by Courtesy of this University, and formerly a professor in Hampden-Sidney College, Va. The lectures will be given in McCoy Hall, Tuesdays, at 5 p. m., beginning January 29. The following characters have been selected:

Francis Nicholson, 1660–1728.
Daniel Dulany, 1686–1753.
Daniel Dulany (the Younger) 1721–1797.
John Hanson, 1715–1783.
John Eager Howard, 1752–1827.
Luther Martin, 1748–1826.

FRENCH LITERATURE.

F. M. Warren, Ph. D., Professor of Romance Languages in Adelbert College, will give six lectures on *The Romantic School*, in the Donovan Room, Mondays, Wednesdays, and Fridays, at 5 p. m., beginning Monday, January 28. His topics are: (1) J. J. Rousseau and his influence. (2) Chateaubriand; Mme. de Staël. (3) Nodier; Lamartine. (4) Victor Hugo. (5) De Vigny; De Musset. (6) George Sand; A. Dumas *père*.

PUBLIC LECTURES, ESPECIALLY DESIGNED FOR TEACHERS, 1900-1901.

1. Education; History; Shakspere.
   Dr. S. E. Forman,—eight lectures on Education, November 2–December 21.
   Dr. G. C. Lee,—seven lectures on English History, January 4–February 15.
   Dr. F. H. Sykes,—six lectures on Shakspere, March 1–30.
   These lectures are given Fridays at 7.30 p. m.
2. Latin.
   Dr. M. C. Sutphen,—a class for beginners (twenty lessons), Thursdays at 4 p. m.
   Dr. H. L. Wilson,—an advanced class (twenty lessons), Thursdays at 5 p. m.
3. Public Aid, Charity, and Correction.
   Dr. J. R. Brackett,—ten lectures, Tuesdays at 5 p. m., till January 22.
4. Physics.
   Professor Ames,—twenty lectures and demonstrations on selected topics in Physics, and twenty conferences, Saturdays at 10.30 a. m.
5. Chemistry.
   Professor Renouf,—twenty experimental lectures on Chemistry in daily life, and twenty conferences, Saturdays at 9.30 a. m.
6. Botany.
   Dr. D. S. Johnson,—twenty lectures on the structure and life-history of the Mosses and Ferns, with laboratory work, Saturdays at 10.30 a. m.

UNIVERSITY SCHOLARSHIPS.

The Board of University Studies has awarded the University Scholarships for the current academic year to the following graduate students:

G. O. Berg.
C. E. Brooks.
A. E. Curdy.
J. H. Eager, Jr.
P. H. Edwards.
J. Embry.
J. A. E. Eyster.
J. W. Harry.
J. G. Hun.
E. P. Hyde.
H. Kurrelmeyer.
G. W. Middlekauff.
B. L. Miller.
R. B. Roulston.
F. P. Rous.

3338

The Johns Hopkins Press of Baltimore.

LIST OF SERIALS ISSUED.

American Journal of Mathematics.

This journal was commenced in 1878, under the editorial direction of Professor Sylvester. Professor Frank Morley is now the Editor. Twenty-two volumes of about 400 pages each have been issued, and the twenty-third is in progress. It appears quarterly. Subscription $5 per year. Single numbers $1.50. A very few complete sets remain. These will be sold for $100 per set.

American Chemical Journal.

This journal was commenced in 1879, with Professor Ira Remsen as Editor. Twenty-four volumes have been issued, and the twenty-fifth is in progress. This journal appears monthly. Two volumes of six numbers and of about 500 pages each are issued yearly. Subscription $5 per year. Single numbers 50 cents.

American Journal of Philology.

The publication of this journal commenced in 1879, under the editorial direction of Professor Basil L. Gildersleeve. Twenty volumes of about 570 pages each have been issued, and the twenty-first is in progress. It appears four times yearly. Subscription $3 per volume. Single numbers $1. Sets are sold at $60 each.

Studies from the Biological Laboratory.

The publication of these papers commenced in 1879, under the direction of Professor H. Newell Martin, with the assistance of Professor W. K. Brooks. Five volumes of about 500 pages, octavo, and 40 plates each, have been issued.

Studies in Historical and Political Science.

The publication of these papers was begun in 1882, under the editorial direction of Professor Herbert B. Adams. Eighteen series are now completed and the nineteenth series is in progress. It appears monthly. Subscription $3 per volume. The set of eighteen series, in cloth, will be sold for $54. Twenty-one extra volumes have also been issued.

Memoirs from the Biological Laboratory.

These monographs are issued under the editorial direction of Professor William K. Brooks. Volume IV is complete. Price of the four volumes $30.

The Johns Hopkins University Circulars.

The publication of these circulars began in December, 1879, and 149 numbers have since been issued. Subscription $1 per year.

Contributions to Assyriology and Comparative Semitic Philology.

The publication of this journal was begun in 1889. Professor Paul Haupt, of the Johns Hopkins University, and Professor Friedrich Delitzsch, of the University of Breslau, are the Editors. Volume IV is in progress.

The Johns Hopkins Hospital Reports.

These Reports are edited by the Faculty of the Johns Hopkins Medical School and published for the Johns Hopkins Hospital. Their publication was begun in 1890. Volume VIII is complete. Price $5 per volume. The set of eight volumes will be sold for $40.

The Johns Hopkins Hospital Bulletin.

The publication of these Bulletins began in 1889. Volume XII is in progress. They are published monthly. Subscription $1.00 per year. The set of twelve volumes will be sold for $23.

Modern Language Notes.

This journal is edited by Professor A. Marshall Elliott and his associates in the Modern Language Department. It appears monthly. The sixteenth volume is in progress. Price $1.50 per year.

Journal of Experimental Medicine.

This journal is edited by Professor William H. Welch with the coöperation of a number of associates. It appears six times a year. Volume V is in progress. Price $5 per year. The set of four volumes will be sold for $25.

American Journal of Insanity.

Professor Henry M. Hurd is the managing editor of this journal. It appears quarterly. Vol. LVII is in progress. Subscription $5 per year.

Terrestrial Magnetism and Atmospheric Electricity.

This journal is edited by Dr. L. A. Bauer. Volume V is in progress. It appears quarterly. Subscription $2.50 per year.

Reports of the Maryland Geological Survey.

These reports are under the editorial direction of Professor William B. Clarke, Director of the Survey.

Reports of the Maryland Weather Service.

The reports are edited by Professor William B. Clark, Director of the Service.

THE JOHNS HOPKINS PRESS ALSO PUBLISHES THE FOLLOWING NAMED SEPARATE WORKS:

A New Polychrome Edition of the Old Testament.

Exhibiting the composite structure of the books with Critical Notes in English, under the title:

The Sacred Books of the Old Testament. Critical Edition of the Hebrew Text, printed in colors, with notes, prepared by eminent Biblical Scholars of Europe and America, under the Editorial Direction of Professor Paul Haupt.

Two editions are issued:—an *edition de luxe*, at $100 per set, and an octavo edition, at a special price per part.

Photographs of the Normal Solar Spectrum.

A series of twenty plates made under the direction of Professor Rowland. The series is sold for $20.

Description of the Johns Hopkins Hospital.

Edited by Dr. John S. Billings, containing 56 large quarto plates with views, plans, etc., and 116 pages of letter-press. Price $7.50.

Reproduction of a Syriac Manuscript of the Antilegomena Epistles.

Reproduction in phototype of seventeen pages of a Syriac Manuscript, containing the Epistles known as "Antilegomena," edited by Professor Isaac H. Hall. Price $3.00.

Lists of publications will be sent on application to The Johns Hopkins Press.

CONTENTS.

Notes and Reviews: PAGE.
History and Politics:
The Revenue System of China. By A. E. Hippisley, - - - - - - 9
The Social Economy Exhibit at the Paris Exposition. By W. F. Willoughby, - 12
Social Justice: A Critical Essay. By W. W. Willoughby, - - - - - 13
Thomas Jefferson: His Life and Writings. By S. E. Forman, - - - - 14
Government in Switzerland. By J. M. Vincent, - - - - - - - 14
Historical Jurisprudence. By Guy Carleton Lee, - - - - - - 15
Philology:
The Genealogy of the pre-Lutheran Bibles. By W. Kurrelmeyer, - - - 15
The Æsopic Fable in Spain and Portugal during the Middle Ages. By George C. Keidel, - - - - - - - - - - - - - - - 16
Biology:
The Study of Marine Biology at Beaufort. By E. A. Andrews, - - - - 17
Physics: PAGE.
Rapport sur l'Équivalent Mécanique de la Chaleur par J. S. Ames. By N. E. Dorsey, - - - - - - - - - - - - - - - 18
Notice of the U. S. Coast Survey's Transcontinental Triangulation. By N. E. Dorsey, 20
The International Congress of Physics at Paris. By H. Crew, - - - - - 20

James Edward Keeler. By W. W. Campbell, - - - - - - - - - 21
The Johns Hopkins University and the South. By W. W. Ballagh, - - - 23
Charles Morton Stewart, - - - - - - - - - - - - - 24
Jesse W. Lazear, - - - - - - - - - - - - - - 24
W. R. Stricklen, - - - - - - - - - - - - - - 24
Proceedings of Societies, - - - - - - - - - - - - - 25
Maryland Colonial History, - - - - - - - - - - - - 25
Lectures on French Literature, - - - - - - - - - - - 25
Public Lectures, 1900–1901, - - - - - - - - - - - - 25

The Johns Hopkins University Circulars are issued monthly. They are printed by JOHN MURPHY COMPANY, No. 44 West Baltimore Street, Baltimore. Subscriptions $1.00 *a year, may be addressed to THE JOHNS HOPKINS PRESS,* Baltimore; *single copies will be sent by mail for ten cents each.*